CITY OF MANCHESTER.

REPORT

ON THE

Health of the City of Manchester,

1906,

BY

JAMES NIVEN, M.A., M.B.

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PUBLIC HEALTH OFFICE,

TOWN HALL, MANCHESTER,

AUGUST 20TH, 1907.

MY LORD MAYOR, ALDERMEN, AND MEMBERS OF THE COUNCIL.

I have the honour to present to you my Annual Report on the Health of the City of Manchester for the year 1906.

The death-rate for the year was 19 per 1000, or, if Withington and Moss Side be excluded, 19·9 per 1000. For the last five years the average death-rate has been under 20 per 1000. As compared with the mean death-rate for the ten years 1891–1900, this average death-rate shows an improvement of over 12 per cent.

The relative position of Manchester amongst great towns is, however, but little altered.

The improvement, great as it is, does not extend to the infantile mortality, which is considered in another report.

The Zymotic death-rate for the year has been high, an increased death-rate having been sustained under Diarrhœa, Measles, Scarlet Fever, and Diphtheria.

The inquiries into the modes of spread of Enteric Fever, Diphtheria, Scarlet Fever, and Diarrhœa have been continued, with results which will be briefly described under these headings.

A considerable amount of consideration has been bestowed on the causes favouring the continuance of Tuberculosis, on the decline which has occurred in recent years in the death-rate from Phthisis, and on the still greater decline in the death-rate from Tuberculosis other than Phthisis. Additional importance has been given to the subject by the reports of the Royal Commission on Tuberculosis recently published. Their effect has been to direct increased attention to food, and more particularly to cows' milk, in the causation of the disease. Increased importance is thus attached to Mr. Brittlebank's report.

The question of nutrition of families invaded by Tuberculosis is seen to be important, both directly and as regards the benefits which the Crossley Sanatorium and other institutions are capable of affording. It is also an important factor in the work to be done under any system of notification.

At the same time, no less value is to be attached to our existing methods of administration than has hitherto been assigned to them.

A study is made in this report of statistical facts which may be supposed to bear upon the effects of the housing policy which has hitherto been pursued, and an effort has been made to throw some light on the conditions of housing in the more central portions of the City, so far as these are capable of statistical handling. It would appear that the work of the Sanitary Committee has not had the effect of increasing overcrowding. Four-roomed houses suffer from an unexpectedly high death-rate. There is much encouragement to the Council in the history of the death-rates of the central sanitary districts to pursue the same lines of action as have been hitherto adopted, although it may be advisable to bestow increased attention on overcrowding in individual houses, and on cleanliness in the dwelling ; while more stress may be laid on judicious instruction of householders in sanitary questions.

No attempt is made in this section to touch upon the question of town planning, which has lately received much attention.

Reports on the work of Monsall Hospital by Dr. Gordon, on that of the Baguley Sanatorium by Dr. Rhodes, on the Health of Withington by Dr. Railton, on the work of the Sanitary Department by Mr. Rook, on the Inspection of Foods by Mr. Minor, and on the work of the Cleansing Department by Mr. Williamson, appear in their due places.

I am indebted to Dr. Goldsmith and the rest of the Staff of the Public Health Office for much assistance during the year.

In various parts of the report, it will be seen that, for more successful work, additional skilled inspection is required.

I have the honour to be,

Your obedient servant,

JAMES NIVEN,

Medical Officer of Health.

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STATISTICAL.

The following are general statistics for the year 1906:—

Area of the City in acres			19,059
Estimated population at the middle of 1906	Males	305,735	637,520
	Females	331,785	
No. of persons per acre			33
No. of inhabited houses at the Census taking, 1901			121,688
No. of uninhabited houses at the Census taking, 1901			9,525
Total No. of tenements			125,875
No. of tenements at the Census taking, 1901, 4 rooms and under			62,749
Average No. of persons at the Census taking, 1901, in houses of 4 rooms and under			4·27
Persons married per 1000 of population in the Manchester, Chorlton, and Prestwich Unions			17·95
Births in the City of Manchester	Males	9,412	18,397
	Females	8,985	
Annual birth-rate per 1000 of population			28·86
Deaths	Males	6,312	12,111
	Females	5,799	
Annual death-rate per 1000 of population	Males	20·65	19·00
	Females	17·47	
	persons		
Deaths under 1 year of age per 1000 births			169·1
Excess of registered births over deaths			6,286
Estimated increase of population during the year			5,587
Annual birth-rate exclusive of Moss Side and Withington			30·05
,, death-rate ,, ,, ,,			19·90
Infantile ,, ,, ,, ,,			173·7

From the general statistics it will be seen that the population is estimated by the Registrar-General for the whole City at 637,520 persons, or, exclusive of Withington and Moss Side, at 566,409. The birth-rate for the whole City was 28·86, and the death-rate was 19 per 1000; while for the part of the City exclusive of Withington and Moss Side the birth-rate was 30·05, and the death-rate was 19·90 per 1000.

The natural rate of increase was 9·86 per 1000. This, as in recent years generally, is in excess of the estimated, and doubtless, also, of the true rate of increase, and the excess is by no means inconsiderable. There is, therefore, a steady stream outwards, and it may be confidently affirmed that the individuals which constitute this stream will have a much lower death-rate than the average inhabitants.

If we may assume the correctness of the Registrar-General's estimate of the rate of increase of the population in the City as constituted prior to 1904, the emigrants must have exceeded the immigrants in the five years 1902–06 by no less than 12,734 persons.

The average death-rate during the five years in question was 19·8 per 1000, and, therefore, just falls below 20 per 1000 for the City as formerly constituted. This marks a stage which we may rejoice to have reached. But it is by no means what one hopes to attain, and there seems to be no reason why, with the increased importance now attached to health and life, we should not, within the next 10 years, descend three points further.

The birth-rate again shows a slight decline on that of the previous year, though only by 0·05 per 1000.

The Registrar-General and Dr. Newsholme, who have considered the causes of the decline in the birth-rate, which has been more marked throughout the country generally than in Manchester, are both of opinion that the prevention of conception is mainly responsible for the decrease. Doubtless the more remote factors are change of standard of comfort, combined with economic considerations. If the change is not so marked in Manchester as in many other towns, this may be ascribed to the sustained demand for workers in the district, and to the more assured prospect of a continued prosperity.

If, however, this be so, there is reason to hope that, as the status of the worker improves, and as the population becomes instructed in more economical modes of living, provided also that the education of the young is such as to equip them for a successful struggle in the field of industry, the tendency to a decline in the birth-rate may be counteracted.

It is of interest to observe in what parts of the City the birth-rate has declined most conspicuously. We can only do so in a rough manner, as, at this distance of time from the last Census, the populations of individual sanitary districts have become uncertain. In the Annual Report for 1901 is given the

mean birth-rate in each sanitary district for the 10 years 1891–1900. Referring now to Table G in the Appendix, and comparing the rates there given with the mean rates mentioned, we perceive that the decline has been general, and, if we make allowance for the inclusion of Moss Side and Withington in South Manchester, has not been markedly greater in one of the main divisions of the City than in another.

It is different when we come to individual sanitary districts.

In the Manchester Township the decline has been much smaller in Ancoats and in the Central district than in St. George's. If we refer to North Manchester, every district, except Blackley, shows a diminution, but the diminution is very much greater in Harpurhey than in the other districts. It is also well marked in Crumpsall and in Cheetham.

In South Manchester a very large reduction is notable in West Gorton ; but the diminution is also considerable in Ardwick and Chorlton-on-Medlock.

Now these differences concern only the year 1906, and individual districts are too small to permit of our regarding the birth-rates in any one year as stable.

We must therefore refer to 1905 to see whether similar figures are given by that year.

When we do so, we find that on a comparison of 1905 with the 10 years 1891–1900 almost precisely the same observations might be made. The reduction in the birth-rate of Ancoats is, however, more marked in 1905 than in 1906, and the reduction is also conspicuous in the case of Moston.

There would thus appear to be special factors operating to reduce the birth-rate in two centres, one having for its foci of greatest intensity St. George's and Harpurhey, and the other the district of West Gorton.

It is possible that some light may be thrown on these differences by a study of the still-births reported by the Registrars of Cemeteries for different districts.

If the birth-rate is affected by economical causes, one of the most important of these is the price of staple articles of consumption. Now, it has been customary to give a table showing the prices paid by the Guardians for flour, butchers' meat, and coal. From this table we see that in 1906 the price of flour was lower than it had been for some years, as was also the price of coarse beef. To balance this, the price of house coal per ton had risen. The same table shows that the average number of indoor paupers relieved by the Manchester Guardians had fallen somewhat, the number of outdoor paupers considerably.

These numbers are, of course, influenced chiefly by the state of trade, which must also affect the birth-rate, but it is not possible to trace any relationship in the figures here presented.

TABLE I.—TOWNSHIP OF MANCHESTER.—PRICES PAID BY THE GUARDIANS FOR FLOUR, BUTCHERS' MEAT, AND COAL, ALSO THE AVERAGE WEEKLY NUMBER OF PERSONS IN RECEIPT OF RELIEF, DURING THE YEARS 1887–1906.

YEAR ENDING	PRICES OF PROVISIONS						PAUPERISM		BIRTH-RATE PER 1,000
	Flour per Sack of 280lbs.	Butchers' Meat, per lb.			Coal, per ton		Average number of Paupers relieved in each week		
		Beef		Mutton	Engine	House	Indoor	Outdoor	
		Coarse	Fine						
1887	25/2 to 30/6	-/3¾	-/6½	-/6½	5/6	8/4	3123	877	33·9
1888	24/- to 29/3	-/3¾	-/6½	-/6½	5/5	8/3	3130	713	33·3
1889	24/11 to 31/2	-/4½	-/6½	-/6½	5/8	8/7	3037	632	33·1
1890	24/9 to 29/11	-/5	-/7	-/7	7/-	9/9	2998	498	31·8
1891	27/3 to 28/11	-/4¼	-/6½	-/6½	8/8	11/2	3118	466	33·8
1892	26/4 to 28/5	-/4	-/6¼	-/6¼	7/6	10/2	3251	551	33·4
1893	21/8 to 25/1	-/3⅞	-/6¼	-/6¼	6/5	10/0	3277	586	33·4
1894	17/2 to 23/9	-/3¾	-/6	-/6	7/1	10/10	3328	395	31·8
1895	15/6 to 21/-	-/3¾	-/6	-/6	5/6	10/3	3343	618	33·4
1896	16/6 to 24/-	-/3⅝	-/5¾	-/5¾	5/7	9/1	3348	533	32·8
1897	17/3 to 33/9	-/3½	-/5⅝	-/5⅝	5/9	8/8	3476	697	32·9
1898	26/7 to 33/8	-/3½	-/5½	-/5½	6/2	8/4½	3519	732	32·3
1899	20/11 to 23/-	-/3½	-/5⅝	-/5⅝	7/5	9/11	3232	597	32·2
1900	20/9 to 22/9	-/3½	-/5½	-/5⅝	11/9¾	14/2½	3189	686	32·4
1901	21/4 to 23/3	-/3⅝	-/5⅝	-/5⅝	11/8	15/2	3403	817	28·7
1902	20/11 to 24/3	-/3⅞	-/5¾	-/5¾	9/3	13/5½	3492	752	33·0
1903	21/10½ to 23/3	-/4⅜	-/6	-/5½	9/-	12/11¼	3521	812	31·7
1904	23/- to 28/6	-/4⅜	-/6	-/6	8/2	11/11	3486	1459	31·1
1905	23/- to 23/9	-/4⅜	-/6	-/6	7/6	10/9	3489	1588	29·0
1906	20/6 to 26/-	-/4¼	-/6	-/6	8/6	11/9	3359	1257	28·9

We may now direct our attention to the deaths occurring during the year 1906.

Deaths of persons belonging to the City of Manchester are referred to the last places of abode, and appear in the death-rates for their respective districts, whether they have occurred within or without the City, in public institutions, or at home.

It is, however, a fact of social importance that a growing proportion of the deaths has, in recent years, occurred in institutions. The number of such deaths in 1906 was 3,078, being slightly over 25 per cent. of all deaths during the year.

Taking into account the small proportion of such institution deaths in the case of the new districts of Withington and Moss Side, we have to record that there is an advance in 1906 in the proportion of deaths occurring in public institutions.

The details are exhibited in Table 2. It appears from this and corresponding tables in recent years that the number of deaths occurring in the Chorlton Union Infirmary shows an increase relative to the number occurring in Crumpsall. This is due, however, to the inclusion of the new districts.

TABLE 2.—POPULATIONS—DEATHS OF MANCHESTER RESIDENTS, 1906, IN PUBLIC INSTITUTIONS.

Township	Name of Institution	Census Population, 1901	Deaths, 1906
ANCOATS	Ancoats Hospital	90	174
	Workhouse Casual Wards (Tame Street)	185	...
CENTRAL	Workhouse Casual Wards	176	2
	Royal Infirmary	274	358
	St. Mary's Hospital	59	46
	Lock Hospital	26	1
	Eye and Ear Hospital	9	3
	Wood Street Mission	18	...
	Chetham Hospital	100	...
	Hardman Street Dispensary	...	...
ST. GEORGE'S	Girls' Home (Charter Street)	36	...
CHEETHAM	His Majesty's Prison	1,028	15
	Boys' Refuge	220	...
	Northern Hospital (late Clinical)	50	49
	Jewish Hospital	...	9
CRUMPSALL *	Manchester Workhouse	2,767	176
	Prestwich Workhouse	504	207

TABLE 2 (continued).—POPULATIONS—DEATHS OF MANCHESTER RESIDENTS, 1906, IN PUBLIC INSTITUTIONS.

Township	Name of Institution	Census Population, 1901	Deaths, 1906
BLACKLEY	Manchester and Salford Reformatory	91	...
	Litchford Hall	231	3
MOSTON	St. Mary's Home	45	...
	St. Joseph's Home	50	...
	St. Bridget's Orphanage	27	...
NEWTON	Monsall Hospital	428	207
	Little Sisters of the Poor (Culcheth Hall)	165	13
CLAYTON	Clayton Hospital	20	15
ARDWICK	Industrial School	204	...
	Nicholls Hospital	96	...
OPENSHAW	Crossley's "Home of Peace"	10	14
RUSHOLME	St. Joseph's Girls' School	176	...
	St. Mary's Home	61	...
CHORLTON-ON-MEDLOCK	St. Joseph's Boys' School	418	2
	Royal Eye Hospital	103	1
	Little Sisters of the Poor (Plymouth Grove)	199	23
	Southern Hospital	28	18
	Cancer Hospital	14	20
	Maternity Home	9	...
	Home for Young Girls	25	...
	Church Army Labour Home	20	...
	Penitentiary	42	...
	Chorlton Union Offices, All Saints	...	1
HULME	Cavalry Barracks	489	3
	Loretto Convent	81	...
MOSS SIDE	"The Home," Whalley Road	...	4
WITHINGTON... *	Chorlton Workhouse	2,013	841
OUTSIDE CITY.	Pendlebury Hospital	180	54
	Prestwich Lunatic Asylum	2,614	60
	Salford Royal Hospital	...	17
	St. Joseph's Home, Eccles	...	2
	Robinson Kay's House, Bury	...	1
	Workhouse, Salford	...	1
	Liverpool Netherfield Hospital and Infirmary	...	2
	County Asylum, Lancaster	...	24
	Asylum, Birmingham	...	1
	Baguley Sanatorium	...	1
	Blackpool Victoria Hospital	...	3
	Mauldeth Hospital for Incurables	...	5
	St. Anne's Home, Dunham Massey	...	1
	Nazareth House, Prestwich	...	1
	TOTAL DEATHS		3,078

* Proportion only.

Certification of Death.

It is of great importance that the causes of death should be ascertained with precision, so that we may have comparable figures in respect of particular diseases, and so that insidious causes of death may not evade attention.

The following figures enable us to ascertain for successive years how we stand in this respect:—

Year	Percentage of Deaths Certified by		
	A Medical Practitioner	The Coroner	Uncertified
1903	91·6	7·0	1·4
1904	92·2	5·9	1·9
1905	91·6	6·7	1·7
1906	91·9	7·3	0·8

The improvement shown in 1906, both in respect of medical certificates and still more in respect of inquests, is highly satisfactory.

The extent to which the certification of the causes of death is duly enforced depends, of course, on the local registrar.

The districts in which the highest proportion of uncertified deaths occurred in 1906 were, in order, Cheetham, Central, Chorlton-on-Medlock, Openshaw, Ancoats, and Ardwick.

This is by no means the order found in 1904 and 1905, in which years Crumpsall was by far the worst. Cheetham, however, remains persistently high.

It is to be hoped that the district registrars will insist on a more satisfactory certification of deaths than has obtained in previous years.

We may now consider the general death-rates at all ages.

As we have seen, the death-rate for the year 1906 was very nearly the average for the last five years. The great improvement shown in 1905 has not been maintained.

The special causes for this will be discussed when we consider the causes of death during the year. Nevertheless, the death-rate for the City before extension in 1904 remains under 20 per 1000.

Table 3, extracted from the Annual Report of the Registrar-General, shows the relative position of Manchester amongst the large towns. It will be seen that, though the improvement in the death-rate continues, the relative position of the City has not changed.

TABLE 3.—RECORDED AND CORRECTED DEATH-RATES PER 1,000 PERSONS LIVING IN 76 GREAT TOWNS IN 1906.

TOWNS, in the order of their Corrected Death-rates	Standard Death-rate *	Factor for Correction for Sex and Age Distribution †	Recorded Death-rate, 1906	Corrected Death-rate, 1906 ‡	Comparative Mortality Figure, 1906 §
Cols.	1	2	3	4	5
England and Wales	18·194	1·0000	15·36	15·36	1,000
England and Wales, less the 76 Towns.....	18·85	0·9652	14·94	14·42	939
76 Towns	17·13	1·0621	15·87	16·86	1,098
King's Norton	17·40	1·0456	9·54	9·98	650
Hornsey.....	15·96	1·1400	8·84	10·08	656
Northampton.....	17·50	1·0397	11·20	11·64	758
Handsworth (Staffs.).....	16·53	1·1007	10·90	12·00	781
Leyton	17·69	1·0285	11·95	12·29	800
East Ham	17·06	1·0665	11·61	12·38	806
Willesden	16·96	1·0728	11·58	12·42	809
Hastings	18·92	0·9616	13·50	12·98	845
Southampton...	18·30	0·9942	13·08	13·00	846
Reading	17·59	1·0343	12·71	13·15	856
Walthamstow.....	17·21	1·0572	12·75	13·48	878
Burton-on-Trent	16·93	1·0747	12·62	13·56	883
Croydon.....	17·75	1·0250	13·38	13·71	893
Devonport	17·35	1·0486	13·12	13·76	896
York	17·67	1·0297	13·67	14·08	917
Brighton.....	18·46	0·9856	14·70	14·49	943
Ipswich	18·63	0·9766	14·87	14·52	945
Bournemouth	17·22	1·0566	13·77	14·55	947
Wallasey	16·63	1·0940	13·49	14·76	961
Bristol	17·71	1.0273	14·46	14·85	967
Tottenham.....	16·86	1·0791	13·83	14·92	971
Aston Manor.....	16·41	1·1087	13·66	15·14	986
Leicester	17·05	1·0671	14·28	15·24	992
Cardiff	16·73	1·0875	14·01	15·24	992
Portsmouth	17·72	1·0267	14·91	15·31	997
Wolverhampton...	17·59	1·0343	14·80	15·31	997
West Hartlepool	16·57	1·0980	13·95	15·32	997
Smethwick.....	16·63	1·0940	14·02	15·34	999
Derby.....	16·88	1·0778	14·23	15·34	999
Walsall	17·18	1·0590	14·64	15·50	1,009
West Bromwich.....	18·04	1·0085	15·54	15·67	1,020
Grimsby.....	16·99	1·0709	14·76	15·81	1,029
Plymouth	18·66	0·9750	16·24	15·83	1,031
Great Yarmouth	19 88	0·9152	17·34	15·87	1,033

or Notes * † ‡ § see page 9.

TABLE 3 (continued).—RECORDED AND CORRECTED DEATH-RATES PER 1,000 PERSONS LIVING IN 76 GREAT TOWNS IN 1906—*continued.*

TOWNS, in the order of their Corrected Death-rates	Standard Death-rate*	Factor for Correction for Sex and Age Distribution †	Recorded Death-rate, 1906	Corrected Death-rate, 1906‡	Comparative Mortality Figure, 1906 §
Cols.	1	2	3	4	5
London	17·31	1·0511	15·11	15·88	1,034
Barrow-in-Furness	16·01	1·1364	14·01	15·92	1,036
Coventry	18·15	1·0024	16·06	16·10	1,048
Halifax	16·79	1·0836	14·93	16·18	1,053
West Ham	17·01	1·0696	15·70	16·79	1,093
Stockton-on-Tees	17·35	1·0486	16·11	16·89	1,100
Norwich	19·05	0·9551	17·72	16·92	1,102
Nottingham	17·27	1·0535	16·09	16·95	1,104
Leeds	16·68	1·0908	15·62	17·04	1,109
Rotherham	17·59	1·0343	16·56	17·13	1,115
Bolton	16·09	1·1308	15·17	17·15	1,117
Gateshead	17·26	1·0541	16·32	17·20	1,120
Hull	17·75	1·0250	16·93	17·35	1,130
Newport, (Mon.)	16·84	1·0804	16·25	17·56	1,143
Rhondda	16·54	1·1000	16·05	17·66	1,150
Sheffield	16·88	1·0778	16·42	17·70	1,152
Bradford	16·46	1·1053	16·12	17·82	1,160
Birmingham	16·91	1·0759	16·79	18·06	1,176
Blackburn	16·09	1·1308	16·03	18·13	1,180
Birkenhead	17·07	1·0658	17·27	18·41	1,199
Newcastle-on-Tyne	16·89	1·0772	17·15	18·47	1,202
Huddersfield	16·96	1·0728	17·32	18·58	1,210
South Shields	17·19	1·0584	17·57	18·60	1,211
Bury	16·25	1·1196	16·63	18·62	1,212
St. Helens	16·79	1·0836	17·23	18·67	1,215
Sunderland	17·64	1·0314	18·57	19·15	1,247
Rochdale	16·45	1·1060	17·42	19·27	1,255
Tynemouth	17·62	1·0326	18·84	19·45	1,266
Swansea	16·96	1·0728	18·30	19·63	1,278
Warrington	16·89	1·0772	18·29	19·70	1,283
Wigan	16·58	1·0973	18·13	19·89	1,295
Bootle	16·52	1·1013	18·23	20·08	1,307
Salford	16·47	1·1047	18·25	20·16	1,313
Merthyr Tydfil	17·16	1·0603	19·08	20·23	1,317
Hanley	16·65	1·0927	18·72	20·46	1,332
Stockport	16·84	1·0804	18·95	20·47	1,333
Preston	16·63	1·0940	19·18	20·98	1,306
Oldham	16·18	1·1245	18·75	21·08	1,372
Manchester	16·32	1·1148	19·17	21·37	1,391
Burnley	16·14	1·1273	19·55	22·04	1,435
Liverpool	17·00	1·0702	20·64	22·09	1,438
Middlesbrough	16·71	1·0888	20·34	22·15	1,442

* The Standard Death-rate signifies the rate at all ages calculated on the hypothesis that the rates for each sex at each of twelve age-periods in each town were the same as in England and Wales during the ten years 1891–1900, the rate at all ages in England and Wales during that period having been 18·21 per 1,000.

† The Factor for Correction is obtained by dividing the Standard Death-rate in England and Wales by the Standard Death-rate in each town, and is the figure by which the Recorded Death-rate should be multiplied in order to correct for variations of sex and age distribution.

‡ The Corrected Death-rate is the Recorded Death-rate multiplied by the Factor for Correction.

§ The Comparative Mortality Figure represents the Corrected Death-rate in each town compared with the Recorded Death-rate at all ages in England and Wales in 1902, taken as 1,000.

Table 4 permits of a comparison between the year 1906 and the mean of the years 1891–1900.

The death-rate shows an improvement of 12·5 per cent. in this year as compared with the mean death-rate in the 10 years.

The largest improvement is observable in North Manchester, and, remembering that the death-rate for South Manchester is 19·41 exclusive of Withington and Moss Side, the next largest is in South Manchester.

As regards individual districts, Ancoats and St. George's both show decided advance in the Township. But the improvements in the death-rates of the following districts in North Manchester are very striking: Cheetham and Harpurhey, followed by Moston, Bradford, Beswick, and Clayton.

In South Manchester, the districts of West Gorton and Ardwick, and to a less extent Openshaw, show a striking improvement. In the sanitary district of Blackley alone is there a falling off, for no apparent reason, and mostly because of the fluctuations which are usually larger in smaller districts. There has been, it is true, an increase in the number of houses during the past two years in excess of what has occurred in previous years, and doubtless the death-rate in 1906 has been affected by this increase. But it is insufficient to account for the whole rise.

I have, therefore, examined the record of deaths in individual districts which is kept in the office, and compared the particulars with those for 1905. It appears that the largest increase is under Diseases of the Heart and Blood Vessels, from Violence, Diseases of the Digestive System, and specified diseases not mentioned in the summary.

No special significance can be attached to the high death-rate in 1906.

Table 4 was originally constructed with a view to see to what extent deaths occurred amongst the very poor, and therefrom to obtain some information as to the degree of poverty existing in the different districts.

The death-rates of persons dying in the Union infirmaries were taken as indices of great poverty; those of persons dying in other institutions being taken to show comparative poverty.

There are circumstances which diminish the value of these indices. The number of persons seeking medical relief within a Union Hospital will depend to no small extent on the favour with which the hospital is regarded, and differences will thus occur between the numbers admitted into one and another hospital.

TABLE 4.—1906.—DEATH-RATES* IN THE HOMES OF THE PEOPLE, IN WORKHOUSES, AND IN HOSPITALS FOR THE VARIOUS DIVISIONS OF THE CITY.

STATISTICAL DIVISIONS		Estimated Populations to middle of 1906	Death-rate per 1000 of persons dying in their own homes	Death-rate per 1000 of persons dying in Workhouses	Death-rate per 1000 of persons dying in Hospitals	Total death-rate per 1000	Mean death-rate 1891–1900
City of Manchester. ...		637,520	14·17	3·02	1·80	19·00	23·28 ++
I. Manchester Township..		128,040	17·13	6·76	3·11	26.99	30·04
II. North Manchester		187,201	13·05	1·14	1·51	15·71	18·31
III. South Manchester		322,279	13·64	2·63	1·46	17·73	22·24
I.	Ancoats	43,575	18·08	5·14	3·74	26·97	30·37
	Central	26,383	15·65	9·89	3·64	29·19	30·98
	St. George's	58,082	17·08	6·54	2·39	26·02	29·46
II.	Cheetham	41,004	8·78	1·10	1·78	11·66	14·50
	Crumpsall	9,301	11·72	1·29	0·86	13·87	15·48
	Blackley	9,573	16·19	1·88	1·88	19·95	17·95
	Harpurhey	20,989	12·10	1·19	0·81	14·10	19·01
	Moston	17,935	10·48	0·33	0·84	11·65	14·11
	Newton	38,521	15·91	1·19	2·05	19·16	19·55
	Bradford	24,997	16·88	1·48	1·80	20·16	23·36
	Beswick	12,377	15·03	1·37	1·13	17·53	20·30
	Clayton	12,504	12·48	0·64	1·12	14·24	17·18
III.	Ardwick	44,261	13·51	2·39	1·92	17·83	21·73
	Openshaw	28,600	15·38	1·61	1·36	18·36	21·67
	West Gorton	31,529	12·94	2·28	1·68	16·91	21·52
	Rusholme and Kirk ...	26,355	12·67	1·37	1·29	15·33	16·05
	Chorlton-on-Medlock ..	56,361	14·37	4·58	1·72	20·67	21·34
	Hulme	64,062	17·01	4·09	1·67	22·78	25·42
	Moss Side.....	28,105	11·88	1·14	1·14	14·16	...
	Withington.....	43,006	8·91	0·86	0·51	10·28	...

* In this table, *every death* occurring in a Public Institution has been referred to the District from which the patient originally came.

‡ Exclusive of Moss Side and Withington.

Moreover, one part of a district may be given over to common lodging-houses, from which a very large number of sick persons obtain admission into the Union Hospital and die there, causing an undue impression of poverty to attach to the district.

There may also be a much smaller provision for sick persons in one Union than in another.

Such has been the case in the Prestwich Union Hospital, as compared with Crumpsall and Chorlton.

As between the Manchester Township and South Manchester the death-rates in the Union Hospitals may be taken as comparative indices, while for a comparison with North Manchester death-rates in other institutions may more usefully be taken.

If we first confine our attention to the death-rates in Union Hospitals, we find that the death-rate in the Manchester Township is more than twice that in South Manchester, while the death-rate in South Manchester is more than twice that in North Manchester, which is only about one-sixth of the rate in the Manchester Township.

Within the Manchester Township, the Union Hospital death-rate is by far the highest in the Central district, and then in St. George's. These two districts contain the majority of the common lodging-houses.

Turning to South Manchester, we see that the Union death-rate is very much higher in Chorlton-on-Medlock and Hulme than in the other sanitary districts, but is higher in West Gorton and Ardwick than in any district of North Manchester.

When we compare the added Union and Institution death-rates, we find that the order is not materially altered, though the proportion of rates to some extent is. We may infer that some of the persons who have died in other institutions would, with more accommodation, have gone to the Prestwich Union Hospital, but the proportion is an uncertain one.

There can be no doubt that the population of the Manchester Township is, on the average, much poorer than that of South Manchester, and the population of South Manchester than that of North Manchester.

On subtracting these death-rates from the general death-rates of the district, we get figures showing the death-rates of persons who have died in their own homes, and this we have regarded as affording a useful index of general sanitary conditions. The death-rates are thus brought nearer to each other, but the Manchester Township has still considerably the highest death-rate, and South Manchester comes next.

In the Manchester Township the Central district has the lowest home death-rate, as might be anticipated. It is probable that there is no great difference in sanitary condition between the three districts making up the Township.

In North Manchester the home death-rate is lowest in Cheetham, then in Moston, Blackley, Harpurhey, and Clayton. It is highest in Bradford, Blackley, and Newton.

This may be regarded as being a fairly stable order, except for Blackley and Clayton.

In South Manchester the home death-rate is highest in Hulme, then in Openshaw, and then in Chorlton-on-Medlock. It is lowest in Withington, and then in Moss Side; yet the home death-rate in Withington is not so low as the home death-rate in Cheetham.

In 1904 the highest home death-rates were in the Bradford and Beswick districts of North Manchester, and in the Hulme and Openshaw districts of South Manchester.

In 1905 the highest home death-rates were in the Bradford district of North Manchester; in Hulme and Openshaw, South Manchester; and in Ancoats and St. George's, Manchester Township.

Death-rates at Different Periods of Life, and as Determined by Sex.

From the following tables we are able to follow the course of the death-rates at different age periods, and to compare them with each other and with the corresponding death-rates in previous years. We can also compare the death-rates of males and females at all ages, and at different periods of life.

From the first and more extended table we perceive that the death-rate descends rapidly from birth, reaching a minimum at the age period of 5 to 9 years. From this point it rapidly ascends, excepting only that the death-rate at ages 20–24 is not very greatly in excess of that at 15 to 19. This is a departure, however, from the normal course, as may be seen on reference to Table 12 in the Annual Report of the Registrar-General.

The death-rate at all ages of females is considerably lower than the death-rate of males in the City of Manchester, as in other large urban communities (see table, page 16).

The excess in the male death-rate is present at all age periods excepting at the ages 5–14 and 20–24. It is very marked at ages 0–4 and above the age of 25.

If we desire to compare the death-rates at different groups of ages in Manchester with those of England and Wales, it is necessary to select the same year, so as to eliminate general meteorological effects.

Thus, for the year 1905 we have the death-rates at :—

	All Ages.	0—	5—	10—	15—	20—	25—	35—	45—	55—	65—	75 -	85 +
England and Wales	15·2 corrected	44·7	3·4	2·1	2·9	3·7	5·2	8·6	14·8	28·6	61·3	127·1	285·2
Manchester.....	17·82	59·18	4·6	2·4	3·6	3·7	6·0	11·4	21·2	40·9	81·8	144·4	347·6

We see that at ages 0–9, and again above the age of 35, the Manchester death-rates are greatly in excess of those of England and Wales generally, while between those ages there is a much closer approximation.

Death-rates at Different Periods of Life.

The death-rates at all ages and at six periods of life are shown in the following tables for the last 16 years :—

Calculated Populations in Age Groups, 1891–1906.

Year	All ages	Under 5 years	5–15 years	15–25 years	25–45 years	45–65 years	65 years and upwards
1891	508,673	63,760	113,489	102,776	147,386	68,258	13,004
1892	512,135	63,776	113,289	103,682	149,087	69,040	13,261
1893	515,835	63,822	113,142	104,637	150,857	69,854	13.523
1894	519,561	63,871	113,001	105,596	152,635	70,671	13,787
1895	523,314	63,924	112,866	106,561	154,420	71,492	14,051
1896	527,094	63,980	112,736	107,532	156,214	72,316	14,316
1897	530,901	64,039	112,613	108,508	158,015	73,144	14,582
1898	534,736	64,101	112,495	109,490	159,825	73,977	14,848
1899	538,599	64,167	112,385	110,477	161,642	74,813	15,115
1900	542,490	64,236	112,276	111,471	163,471	75,653	15,383
1901	546,408	64,308	112,175	112,470	165,306	76,497	15,652
1902	550,355	64,773	112,985	113,283	166,501	77,049	15,764
1903	554,331	65,256	113,838	114,109	167,689	77,550	15,889
1904	558,335	65,752	114,714	114,953	168,893	78,037	15,986
*1905	562,346	66,254	115,595	115,803	170,089	78,522	16,083
†1905	631,933	71,962	126,742	130,834	193,202	89,924	19,269
*1906	566.409	66,759	116,486	116,658	171,312	79,013	16,181
†1906	637,520	72,627	127,919	132,005	194,906	90,643	19,420

For Notes * † see page 15.

Death-rates in Age Groups, 1891–1906.

Year	All causes	Under 5 years	5–14 years	15–24 years	25–44 years	45–64 years	65 years and upwards
1891	25·97	86·6	4·80	5·65	13·93	40·4	134·2
1892	23·22	78·7	4·59	5·37	12·06	35·9	114·4
1893	24·35	86·3	4·73	4·94	12·51	35·3	121·7
1894	19·93	66·5	3·97	4·52	11·16	29·5	100·9
1895	24·68	90·7	4·67	5·19	11·92	35·9	116·0
1896	22·53	80·4	4·08	4·89	11·22	33·3	110·9
1897	22·58	85·3	3·94	4·54	10·24	32·4	109·9
1898	21·49	78·1	3·55	4·14	10·80	32·0	104·1
1899	24·22	87·5	4·22	4·86	11·80	36·4	118·6
1900	23·79	78·3	4·21	4·63	12·52	39·7	119·4
1901	21·60	74·5	4·44	4·40	10·48	34·2	106·0
1902	20·03	64·7	4·12	4·39	10·26	33·8	99·2
1903	19·45	69·5	3·71	4·05	8·99	29·7	97·5
1904	20·89	75·8	3·71	4·15	9·40	31·3	109·5
*1905	18·74	61·9	3·75	3·87	8·77	30·3	104·9
†1905	17·82	59·2	3·51	3·65	8·24	28·6	99·4
*1906	19·90	69·3	3·97	3·51	9·49	29·9	111·3
†1906	19·00	66·6	3·67	3·37	8·94	28·3	105·5

* Exclusive of Moss Side and Withington.

† Inclusive of Moss Side and Withington.

Turning now to the table in which the death-rates at six age groups are compared over a series of years, we see that since 1891 there has been a reduction in the death-rate of each age group.

This has been least at ages above 65, but is nevertheless evident.

At all other ages the improvement in the death-rate is very conspicuous, being for 1906 greatest at ages 15-24 years. But it is also very great at ages 25–64, and at ages 0–4 and 5–14, though less in the latter than at higher ages.

One cannot but feel some surprise that, in face of such great reductions in the death-rates at different periods of life, the reduction in the general death-rate should not be greater than it is, until one remembers that there has been but little diminution in the infantile mortality. How much is implied in this is seen at once when we note that 3,111 out of the total of 12,111 deaths occurring in 1906 were of infants under 1 year of age.

The average number of deaths of infants under 1 year of age for the 10 years 1894–1903 was 184. In 1906 the number of deaths, excluding Withington and Moss Side, was 174. In 1904 the number was 187, and in 1905 it was 164.

TABLE 5.—ANNUAL RATES OF MORTALITY IN MANCHESTER IN THE YEAR 1906 AT TWELVE GROUPS OF AGES AMONGST PERSONS—MALES AND FEMALES.

GROUPS OF AGES	PERSONS			MALES			FEMALES		
	Estimated Population	Deaths	Death-rates	Estimated Population	Deaths	Death-rates	Estimated Population	Deaths	Death-rates
All Ages	637,520	12,111	19·00	305,735	6,312	20·65	331,785	5,799	17·47
0 —	72,627	4,837	66·60	36,176	2,614	72·26	36,451	2,223	60·99
5 —	65,141	289	4·44	32,363	140	4·33	32,778	149	4·55
10 —	62,778	180	2·87	31,434	73	2·32	31,344	107	3·41
15 —	63,792	209	3·28	30,592	107	3·50	33,200	102	3·07
20 —	68,213	236	3·46	31,534	107	3·39	36,679	129	3·52
25 —	113,321	749	6·61	53,740	399	7·42	59,581	350	5·87
35 —	81,585	993	12·17	39,461	545	13·81	42,124	448	10·64
45 —	56,728	1,200	21·15	27,158	681	25·08	29,570	519	17·55
55 —	33,915	1,369	40·37	15,437	733	47·48	18,478	636	34·42
65 —	15,039	1,298	86·31	6,251	611	97·74	8,788	687	78·18
75 —	4,051	621	153·29	1,486	249	167·56	2,565	372	145·03
85 +	330	130	393·94	103	53	514·56	227	77	339·21

It is this persistent high infantile mortality which obscures the great progress which is really being made in the saving of life, or at all events prevents us from having the full benefit of the advance made at other ages.

Causes of Death.

We may now consider what are the causes of death which require especial attention during the year 1906.

The following are the principal causes of death during the year :—

Phthisis	1089	Premature Birth	406
Tuberculosis of Organs other than the Lungs	403	Nephritis and Bright's Disease	238
Diseases of the Heart ...	1242	Convulsions	171
Cerebral Hæmorrhage, Apoplexy, Hemiplegia	466	Inflammation of the Brain ...	137
Pneumonia	1108	Diarrhœa and Dysentery ..	981
Bronchitis	1011	Measles 475	895
Atrophy, Debility (chiefly in infants)	581	Scarlet Fever... 108	
Old Age...	286	Whooping Cough 193	
		Diphtheria 119	
		Malignant Disease	562

If we compare this statement with the corresponding one on page 5 of the Report for 1905, we perceive that in spite of some small improvements there are serious losses in 1906 as compared with 1905. It would have been a very gratifying occurrence had the low death-rate from Phthisis in 1905 been continued. Instead, there are 100 more deaths in 1906. This is also the case with Heart Disease. From Diarrhœa and Dysentery there are 252 more deaths, and from Measles 244 more.

There are, however, some slight improvements under Pneumonia, Premature Birth, and Convulsions.

The gains and losses in the death-rates from various causes as compared with the average of the previous 10 years are shown in the following figures :—

Gains in 1906 *per* 1000 *persons living, as compared with the average for the* 10 *years* 1896-1905—(See Table K).

Smallpox	0·01
Influenza	0·07
Whooping Cough	0·14
Enteric Fever	0·01
Alcoholism	0·02
Phthisis	0·18
Tuberculous Diseases (other)	0·13
Rheumatic Fever	0·01
Nervous Diseases	0·16
Bronchitis	0·37
Pneumonia	0·49
Respiratory Diseases (other)	0·07
Digestive System	0·05
Urinary System	0·03
Total	1·74

Losses in 1906.

Measles	0·11
Diphtheria	0·02
Diarrhœal Diseases	0·22
Puerperal Fever	0·01
Septic Diseases	0·01
Cancer	0·13
Premature Birth	0·02
Heart and Blood Vessels Diseases	0·13
Old Age	0·05
Total	0·70
Balance of Gain from above Causes	1·04
Do. All Causes	1·50

These rates are exclusive of Moss Side and Withington.

Only from one cause does the gain in this year exceed that in other recent years, viz., from Pneumonia.

Decided losses occur under Measles, Cancer, Diarrhœa, and Heart Disease.

Nevertheless, there remains an aggregate gain in respect of the average of the previous 10 years of 1·50 per 1000, representing an annual saving of 850 lives. As these lives are saved more especially in adult life, the sum so saved to the City is a large one, though it is not possible to give an actual figure.

Table E in the Appendix enables us to follow the course of mortality over a long series of years from each of the group of Zymotic Diseases, and also under the heading of Violence.

Zymotic Diseases.

No death occurred from *Smallpox* in 1906. From *Measles*, as we have seen, the death-rate was high—higher, in fact, than in any year since 1899. It is manifest that, although some effect may be produced by the steps which we are taking in conjunction with the Education Authority, they are not likely to make a very great impression on the disease. If it is desired to make an effort to deal more effectually with the disease, the first step must be to provide a staff of sanitary officers, who should visit the affected districts, and instruct the parents in the steps necessary to be taken. It must be admitted, however, that a decided impression is not likely to be made on this disease without considerable expenditure. Under *Scarlet Fever* there is also an increase in the death-rate, corresponding to a considerable increase in the number of cases. The accommodation provided at Monsall Hospital having greatly diminished, by the disuse of the wooden pavilions, it was found necessary to refuse admission to a large number of cases. This may possibly have been in part responsible for the large number of cases occurring. *Diphtheria* did not increase. The death-rate from *Whooping Cough* has remained stationary during the past three years. *Enteric Fever* shows an increased death-rate, though one exceeding only by ·01 per 1000 the average death-rate of the preceding five years. *Epidemic Diarrhœa*, however, exacted a very heavy death-rate in 1906, and we have to go back to 1901 to find a death-rate equally severe from this cause. This particular cause of death owns a group of causes, some of which are very baffling. At the same time, there can be no doubt that any effectual action taken in the way of instructing young mothers would greatly aid in reducing the death-rate. The subject has been discussed in previous reports, and will be dealt with in its place.

Table F shows since 1881 the death-rate from the principal classes of disease, from Cancer, and from Tabes Mesenterica, which is placed side by side with Phthisis.

Taking first the group Tabes, Phthisis, and other Tuberculous Diseases, we find that the death-rate ascribed to Tabes has been reduced by more than 50 per cent. since 1881–85, and if we confine our attention to the years 1891–1906 the reduction from 25 to 15 per 100,000 persons is a striking one, as it is if we take the more stable figures—from 22 in 1891–1895 to 16 in 1901-05. It is possible that the action pursued under the Manchester Milk Clauses has had something to do with this reduction. There has not been an equally great reduction in the Phthisis death-rate. Nevertheless, the reduction here, also, has been considerable, especially during the last four years. The death-rate from Phthisis in 1906 was 1·81 in 1906 in the City, exclusive of Withington and Moss Side, an advance on any previous year except the record year of 1905.

The improvement in other tubercular diseases is no less marked than under Tabes Mesenterica, and corresponding to the improvement under Tabes and Phthisis in 1904, 1905, and 1906, there is also an improvement under other tubercular diseases. We may, therefore, assume that a definite impression is being made on Tuberculosis.

Under the heading *Diseases of the Nervous System*, also, marked improvement is shown.

This is a very miscellaneous group, and includes diseases owning widely different causes, such as inflammation of the brain, softening of the brain, insanity, epilepsy, convulsions, neuritis, and tumour.

The main cause of the improvement in this group is the transference in 1901 of Apoplexy and Hemiplegia to the group Heart and Blood Vessels.

Nevertheless, there has been some improvement within the last two or three years under the headings Inflammation of the Brain and Convulsions. The first heading is peculiarly important, as the reduction here makes it manifest that Cerebro-spinal Fever, which has now made its appearance, has not hitherto been present to an unusual extent.

Having regard to the transference mentioned, the increase which has occurred under *Diseases of the Circulatory System* is so slight that we may affirm that in this group a distinct improvement has in reality occurred in recent years.

If we look down the column *Diseases of the Respiratory System*, we find that an immense improvement is here manifest, the lowest death-rate of all being in 1906. Many of the deaths under this heading are undoubtedly tuberculous,

although probably this is less the case than in former years, and in estimating the reduction in the death-rate from Phthisis, it is necessary to take account of this column. Taking this along with the Phthisis column, we may surmise that the real reduction in the Phthisis death-rate has, especially in the last two years, been greater than the apparent reduction ; and that the apparent inequality between the reduction in the death-rate from Phthisis and from other forms of Tuberculosis may in part, at least, be thus explained.

A similar marked reduction is also observed from 1903 onwards in the death-rate from "*other respiratory diseases,*" which may be regarded as more intimately associated with Tubercular Phthisis than Bronchitis and Pneumonia.

Slight improvement is also manifest in respect of *Diseases of the Digestive and Urinary Systems.*

From *Cancer,* however, the death-rate shows a steady and almost uninterrupted ascent.

Table K in the Appendix permits a somewhat further sub-division of the causes of death, and of the comparison with previous years.

We thus see that great reductions have taken place in the death-rate from Bronchitis, Pneumonia, and other respiratory diseases.

The total reduction under the head of Respiratory Diseases in 1906 as compared with the average of the 10 years 1896–1905 is 1·21 per 1000, constituting the greater part of the advance shown in the year.

Some causes of death given in this table may be briefly mentioned. Under Influenza we find that there is a gain of ·07 per 1000. Puerperal Fever, Erysipelas, Pyæmia, and Septicæmia, together reveal a loss of ·02 per 1000. Under Rheumatic Fever there is a slight gain of ·01 per 1000. Under Premature Birth there is a loss of 0·02 ; and under Alcoholism a gain of 0·02 per 1000.

But, with the exception of Influenza, all the causes enumerated show only slight changes.

We may now consider the causes of death at different groups of age.

Infancy.—It has already been pointed out that at all ages except infancy an immense reduction has taken place in the death-rate since 1891. At this age, however, the improvement has been comparatively small, with the result of obscuring how great has been the change at other ages.

The following table shows the mortality per 1000 births for the first and second *trimesters*, and for the last six months of the first year of life. In each period an improvement is manifest—less, however. in the first three months than afterwards.

Deaths per 1,000 *births at the ages* 0–3 *months,* 3–5 *months, and* 6–11 *months, in successive years.*

Years	Months of Age			
	0–2	3–5	6–11	Under 1 year
1891–95 (mean)	82·79	40·99	62·97	186·75
1896	78·71	38·11	59·31	176·13
1897	82·31	42·43	69·89	194·63
1898	86·64	42·72	66·51	195·87
1899	88·14	46·49	70·79	205·42
1900	81·42	42·42	64·91	188·75
1901	88·90	42·96	66·60	198·46
1902	73·49	32·23	45·73	151·45
1903	79·91	36·37	52·25	168·53
1904	84·37	42·01	60·34	186·72
1905	78·42	34·05	46·28	158·75
1906	78·65	35·77	54·68	169·10

The shifting of mortality towards the first three months is shown more plainly when the facts are presented in the following manner:—

Percentage of total infantile mortality occurring in sections of the first year of life for triennial periods from 1891 *to* 1906.

Years	Ages			
	0–3 months	3–6 months	6–12 months	Average rate of mortality
1891–93	44·9	21·6	33·5	190
1894–96	43·8	22·2	34·0	180
1897–99	43·1	22·1	34·8	199
1900–02	45·3	21·8	32·9	178
1903–05	46·7	22·1	31·2	173

This shifting, however, so far as Manchester is concerned, is more apparent than real, and is due to the relatively low incidence of Diarrhœa in recent years, a high Diarrhœa mortality having the effect of depressing the percentage of mortality in the first three months, owing to the relative immunity of sucklings.

There is, however, a tendency to increase in the mortality ascribed to prematurity. The subject of the diseases concerned is discussed in a separate report, and need not be reconsidered here. I will only repeat that the most powerful factor in the reduction of infantile mortality will, in my opinion, be the suitable education for girls and young women.

At the various age groups it appears sufficient to compare the causes of death with those holding in 1905, at which the death-rate touched its lowest point at every age group except 5–14, and above 65 years.

At ages 0–4, there is an increase in the death-rate in 1906 over that in 1905 from Measles of 3·21 per 1,000, from Diarrhœa of 3·27. These two increases nearly account for the total increase in the death-rate at this age, viz., 7·42 per 1,000. There is, however, also an increase from Scarlet Fever of 0·3, from Tubercular Disease of 0·29, from Malignant Disease of 0·03, from Diseases of the Digestive System of 0·62, and from Unnamed Causes of 0·39, adding up to 1·63 per 1,000.

On the other hand, there is a diminution under Whooping Cough of 0·07, under Diseases of the Heart and Blood Vessels of 0·10, and under Disease of the Respiratory System of 0·48—making a total of 0·65.

At ages 5–14 there is a slight falling-off in 1905 as compared with the two previous years, and a falling-off in 1906 as compared with 1905 of 0·12 per 1,000.

The losses sustained are: under Measles 0·08 per 1,000, Scarlet Fever 0·03, Whooping Cough 0·01, Fever 0·02, Respiratory System 0·03, Digestive System 0·05, Urinary System 0·06, unnamed causes 0·07—adding up to 0·35 per 1,000.

Per contra there are gains under Diphtheria 0·13, under Tubercular Disease of 0·07, and under Diseases of the Heart and Blood Vessels of 0·03—adding up to 0·23.

At ages 15–24, the death-rate for 1906 touches the lowest point, and is lower by 0·28 per 1,000 than in 1905. Further, the death-rate at this age now falls below that at school period.

Losses are sustained under Scarlet Fever of 0·02, under Diphtheria of 0·01, under Enteric of 0·07, under Tubercular Disease of 0·04, and under Diseases of the Respiratory System of 0·03—adding up to 0·17 per 1,000. The gains are

under Measles 0·02, Diseases of the Nervous System 0·07, Heart and Blood Vessels 0·08, Digestive System 0·12, Urinary System 0·02, Unnamed Causes 0·15—total gain, 0·46.

At ages 25–44 there is a rise in the death-rate of 0·7 per 1,000. The losses are under Diphtheria 0·02, Enteric Fever 0·04, Diarrhœa 0·01, Tubercular Disease 0·31, Malignant Disease 0·04, Nervous System 0·03, Heart and Blood Vessels 0·06, Respiratory System 0·02, Digestive System 0·09, Urinary System 0·08, Unnamed Diseases 0·05—adding up to 0·71 per 1,000.

At ages 45–64 there is a slight gain of 0·23 in the death-rate. The losses are Fever 0·12, Diarrhœa 0·05, Tubercular Disease 0·33, Malignant Disease 0·05, Heart and Blood Vessels 0·54, and Digestive System 0·06—adding up to 1·15 per 1,000.

The gains are under Diseases of the Nervous System 0·09, Respiratory System 0·74, Urinary System 0·06, Unnamed Diseases 0·47—total, 1·36.

Above 65 years of age there is a slight loss to be found chiefly under Diarrhœa, Tubercular Disease, and Diseases of the Heart and Blood Vessels.

Causes of death in the three main divisions of the City.

In Table K we have the means of comparing the death-rate at all ages from a variety of causes, constituting the greater part of the causes of death. For strictness of comparison we should require to have these death-rates corrected for age and sex, a correction which would be very laborious. For most purposes, however, the figures are near enough.

In a comparison of the three main divisions of the City, it has been thought desirable to exclude the new areas of Withington and Moss Side. It is thus possible to follow the course of the general death-rate in each division, year by year, from all causes, and from a variety of causes, and trace the course of events in a manner in each separately.

Taking now only the year 1906, and excluding Moss Side and Withington, we perceive that there is a gradation of mortality from one division to another as marked as ever, though in each the mortality has been reduced. This gradation from the Manchester Township to South Manchester, and from South Manchester to North Manchester, is conspicuous in respect of Measles, Influenza, Diarrhœa, Septic Diseases, Phthisis, Other Tuberculous Diseases, Alcoholism, Cancer, Nervous Diseases, Diseases of the Heart and Blood Vessels, Pneumonia, Diseases of the Digestive Organs, Diseases of the Urinary Organs, Old Age.

Manchester Township—Death-rates from

	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
Diarrhœa	1·08	1·08	2·22	1·11	2·20	1·43	2·33	2·58	2·60	2·12	2·72	0·73	1·41	1·86	2·09	2·62
Phthisis	3·04	3·05	2·97	2·97	3·29	3·12	3·35	3·02	3·09	3·52	3·49	3·54	3·co	3·14	3·co	2·99
Cancer	0·65	0·72	0·68	0·65	0·74	0·63	0·80	0·81	0·93	0·87	0·85	0·76	0·84	0·95	0·90	0·98
Nervous Diseases	2·66	1·99	2·08	1·99	2·03	1·81	1·54	1·32	1·73	1·84	1·63	1·31	1·34	1·46	1·33	1·24
Diseases of the Heart and Bloodvessels	3·02	3·20	2·92	2·78	3·25	3·09	2·93	2·98	3·21	3·25	2·93	3·08	3·13	3·24	2·48	3·37
Bronchitis	4·57	3·53	3·50	2·88	3·99	3·01	2·70	2·13	3·35	3·38	2·55	2·49	2.69	3·20	2·36	2 59
Pneumonia	3·72	3·32	3·62	2·79	3·57	3·37	2·88	3·03	4·02	4·12	2·94	3·56	2·62	2·35	2·67	2·74
Digestive Organs	1·20	1·32	1·29	1·06	1·06	1·30	1·13	1·14	1·13	1·23	1·07	1·05	1·11	1·37	1·03	1·16
All Causes. (Corrected from 1891 to 1900)	32·07	30·20	30·60	25·73	32·36	30·04	29·75	26·87	32·19	30·62	27·52	25·13	25·26	26·75	24·39	26·99
Bronchitis, Pneumonia, and Phthisis	11·33	9·90	10·09	8·64	10·85	9·50	8·93	8·18	10·46	11·02	8·98	9·59	8·31	8·69	8·03	8·32
Tuberculosis other than Phthisis	0·97	1·11	1·05	0·98	1·co	0·78	1·05	0·93	0·92	0·94	1·14	0·89	0·95	0·79	0·69	0·87

From Bronchitis also the death-rate is much higher in the Manchester Township than in the other two divisions, but is higher in North Manchester than in South Manchester. The same is true of Scarlet Fever.

From Rheumatic Fever and premature birth the death-rate is highest in South Manchester. From the following diseases the death-rate is highest in North Manchester: Whooping Cough, Diphtheria, and Puerperal Fever; but the differences are small.

It is of some importance to follow the course of the death-rates from certain diseases in the three main divisions over a number of years.

We thus see that in recent years since 1901 there appears to have been a great improvement in the death-rate of the Manchester Township, and in all probability this improvement is a fact.

How do we stand in respect of individual diseases? There would appear in the history of recent years to be ground for hope that the improvement in the Diarrhœa death-rate would be lasting, were it not for the reversion to the old high figure in 1906. We have, also, only to go back to 1891–1894 to see a period of reduced Diarrhœa deaths comparable with 1902–1905.

The condition of the Manchester Township has, thus, not improved so much that we can with confidence anticipate a lowered death-rate from Diarrhœa without great further change.

In like manner, the improved death-rate from Phthisis in 1903–1906 is paralleled by a period of improvement in 1891–1894. There are, therefore, special conditions producing temporary elevations of the death-rate from Phthisis in the centre of the City, with which we may again have to deal.

There is, however, a marked reduction in the death-rate from Pneumonia in 1903–1906, which was not in evidence in 1891–1894; and this is true, also, of the death-rate from Bronchitis.

It is possible, and indeed probable, that there has been transference of deaths from one class of chest disease to another, and that the reduction in the Phthisis death-rate has thus been greater than appears.

When we add together the death-rates from Phthisis, Pneumonia, and Bronchitis, we perceive that the years 1903–1906 show a marked improvement in the aggregate death-rate as compared with the period 1891–1894.

We may attempt to determine whether the death-rate of Phthisis, or the combined death-rate from Phthisis, Pneumonia, and Bronchitis, is the better measure of the reduction in Phthisis in this way.

If we add together the death-rates from other forms of Tuberculosis, we shall have a series which may reasonably be supposed to stand in relation to the death-rates from Tubercular Phthisis, even allowing for uncertainty in diagnosis and for the element of milk infection.

When we do so, we see that the death-rates from other forms of Tuberculosis in the Manchester Township in 1903–1906 bear to those in 1891–1894 a relation which is nearer to that of the combined respiratory death-rates in the same periods than to that of Phthisis.

It appears probable, therefore, that the improvement in the Phthisis death-rate since 1903 possesses some degree of stability.

The high Phthisis death-rate in 1900–1902, however, demands special comment. The most probable explanation is the outburst of arsenical poisoning which occurred in 1899–1900. The tendency of this condition to produce Phthisis was commented upon at the time.

If, however, we are led to hope for a permanent improvement in the death-rate from chest diseases, the upward trend of Cancer is marked and threatening.

No improvement in recent years is to be observed in respect of Nervous Diseases, Heart Disease, or Digestive Diseases.

In spite, therefore, of the marked improvement in the death-rate of the Manchester Township in recent years, the struggle for assured victory has yet to come.

If, now, we construct a similar table for South Manchester, we find that the same general features reproduce themselves.—(See page 28.)

We have the same reduction in recent years in the Diarrhœa death-rate, which, however, is not so great as was the fall in this division in the years 1891–1895. We must, therefore, ascribe the recent improvement in large measure to meteorological factors, and be prepared for reverses such as occurred from 1897 to 1901, unless a sustained effort is made to remove the causes of the high death-rate.

From Nervous Diseases there is decided improvement in the last three years. Possibly this is due to diminution in the consumption of alcohol. But we note that there is an even greater increase in the death-rate from Diseases of the Heart and Blood Vessels.

By an alteration made in 1901, a portion of the deaths formerly placed under Nervous Diseases is now included under Diseases of the Blood Vessels.

South Manchester, exclusive of Withington and Moss Side—Death-rates from

	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
Diarrhœa	0·69	0·67	1·59	0·54	1·50	0·94	1·54	1·79	1·78	1·45	1·56	0·50	0·84	1·25	0·94	1·50
Phthisis	2·02	1·90	1·94	1·73	1·97	1·78	1·83	1·69	1·86	1·80	1·93	1 83	1·79	1·90	1·53	1·79
Cancer	0·70	0·61	0·63	0·71	0·66	0·76	0·76	0·69	0·75	0·80	0·84	0·82	0·80	0·90	0·92	0·96
Nervous Diseases	2·29	1·61	1·67	1·28	1·29	1·18	1·33	1·16	1·29	1·34	1·13	1·11	1·32	1·05	1·09	1·05
Diseases of the Heart and Bloodvessels	2·77	2·54	2·43	2·36	2·48	2·55	2·45	2·85	3·03	3·04	2·58	2·60	2·50	2·67	2·82	2·82
Bronchitis	3·27	2·55	2·33	1·86	2·08	2·15	1·79	1·78	2·17	2·32	1·86	1·87	1·67	2·01	1·61	1·44
Pneumonia	2·29	1·89	2·28	1·74	2·37	2·46	1·92	1·89	2·45	2·84	2·21	2·06	1·80	2·04	2·03	1·82
Digestive Organs	0·95	1·07	1·18	1·01	1·06	0·93	1·02	1·02	1·05	1·27	1·12	1·03	0·92	0·89	0·85	0·95
Bronchitis, Pneumonia, and Phthisis	7·58	6·34	6·55	5·33	6·42	6·39	5·54	5·36	6·48	6·96	6·00	5·76	5·26	5·95	5·17	5·05
Tuberculosis other than Phthisis	1·25	1·05	1·15	0·95	1·15	0·86	0·99	0·97	0·90	0·83	0·82	0·77	0·90	0·82	0·75	0·81
All Causes	24·46	21·43	23·28	19·20	23·53	21·25	21·62	20·87	23·22	23·51	21·08	19·19	19·31	20·51	18·62	19·41

It may be that the transference is not complete even yet, and in that case we must add the two classes of deaths. When that is done, the combined death-rate is almost stationary.

A stationary or even an increased death-rate under this heading does not necessarily imply retrogression, as it may simply mean that more persons are reaching advanced years and are dying of the diseases incidental to advanced life.

We see the same steady and somewhat ominous advance in deaths from Cancer in South Manchester as in the Manchester Township. But here again we have to consider the altered constitution of the population, which, owing to a diminishing birth-rate, and to the great improvements in the death-rates at all age periods up to 65, has been becoming, if one may so put it, much older. Cancer being a disease, in the main, of advanced years (see Table M), no small part of the increased death-rate must be ascribed to this cause. The increase is greater, however, than can be accounted for in this manner.

There is marked improvement in recent years under Diseases of the Digestive Organs. It is doubtful, however, whether this is a permanent advance. If we analyse the factors making up this death-rate, we find that what improvement there is, is shown under Diseases of the Liver and Gall Bladder. The rise in the death-rate in 1900 and 1901 occurs under Cirrhosis of the Liver and Diseases of the Stomach, no doubt in association with the outburst of arsenical poisoning. In 1902 the death-rate is sustained by a high mortality under Diseases of the Stomach. In 1906 the mortality is high both under Diseases of the Stomach and under Enteritis and Gastro-enteritis.

It is, however, to Respiratory Diseases that the chief interest attaches.

There is here no doubt as to the reduction in the Phthisis death-rate in recent years. But, unlike the Manchester Township, the Southern division shows a marked diminution in recent years as compared with 1891–1894

There is, however, no sharp fall in 1903 such as occurs in the Manchester Township. On the other hand, if we take the aggregate death-rate from Bronchitis, Pneumonia, and Phthisis, a very sharp fall takes place in 1903, and the death-rate in 1903–06 stands out conspicuously by comparison with 1891–94.

There is also in recent years a conspicuous drop in the death-rate from forms of Tuberculosis other than Phthisis. This, however, is not characterised by a fall in 1903, but is first sharply marked in 1900, with a second fall in 1902.

A sharp fall in the death-rate from all causes makes itself manifest first in 1902, and the average death-rate of the last five years is conspicuously lower than that of any previous five years. This advance is due in no small measure to the improvement under Respiratory Disease,

North Manchester.

If, now, we construct a similar table for North Manchester, we obtain results which do not differ widely from those shown in the previous tables.

North Manchester—Death-rates from

	1891	1892	1893	1894	1895	1896
Diarrhœa	0·70	0·68	1 49	0·52	1·38	0·79
Phthisis	1·52	1·19	1·20	1·27	1·30	1·19
Cancer	0·49	0·49	0·39	0·58	0·47	0·54
Diseases of the Nervous System ..... Diseases of the Heart and Bloodvessels	4·07	3·59	3·49	3·11	3·60	3·21
Bronchitis	2·54	2·14	1·75	1·27	2·17	1·84
Pneumonia	2·47	1·74	2·18	1·53	2·09	1·90
Digestive Organs	1·00	1·08	1·13	0·75	0·98	0·94
Bronchitis, Pneumonia, and Phthisis	6·53	5·07	5·13	4·07	5·56	4·93
Tuberculosis other than Phthisis	0·71	0·63	0·73	0·55	0·71	0·48
All Causes	21·58	18·57	19·39	15·10	18·84	17·30

	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
Diarrhœa	1·48	1·62	2·00	1·10	1·61	0·44	0·64	1·16	1·14	1·23
Phthisis	1·38	1·33	1·34	1·32	1·21	1·29	1·05	1·23	0·96	1·03
Cancer	0·63	0·70	0·55	0·61	0·63	0·78	0·66	0·58	0·74	0·72
Diseases of the Nervous System ..... Diseases of the Heart and Bloodvessels	3·37	3·67	3·14	3·22	1·03 / 2·21	1·03 / 2·24	1·10 / 1·89	1·14 / 2·37	0·94 / 2 04	1·03 / 2·05
Bronchitis	1·84	1·55	1·74	2·01	1·64	1·75	1·51	1·66	1·50	1·48
Pneumonia	1·89	1·88	2·26	2·27	1·64	2·12	1·38	1·60	1·37	1·22
Digestive Organs	0·93	0·84	0·78	0·91	0·78	0·70	0·98	0·93	0·67	0·81
Bronchitis, Pneumonia, and Phthisis	5·11	4·76	5·34	5·60	4·49	5·16	3·94	4·49	3·83	3·73
Tuberculosis other than Phthisis	0·57	0·63	0·69	0·56	0·42	0·47	0·41	0·41	0·42	0·37
All Causes	17·40	17·61	18·82	18·47	17·57	17·22	15·20	17·12	14·89	15·71

The same advance is manifest in the Cancer death-rate as we have noted in the other two divisions of the City. It is difficult to judge within the limits of the years reviewed whether any improvement has taken place in the death-rate from Heart Disease, though a tendency in that direction appears to be present.

If we combine Diseases of the Nervous System and Diseases of the Heart and Blood Vessels, we see that some, though not a great, improvement has occurred.

No improvement is shown in respect of Diseases of the Digestive Organs, or only a very slight improvement, since 1893.

From Diarrhœa the death-rate is nearly as high in the years 1902–1906 as it was in 1891–1895.

From Phthisis, however, the death-rate shows marked improvement, commencing with the year 1903; and the same is manifest in regard to the death-rate from Pneumonia.

The great advance made within the last four years in Respiratory Disease becomes especially conspicuous when the combined death-rate from Bronchitis, Pneumonia, and Phthisis comes under review. The improvement in the death-rate from forms of Tuberculosis other than Phthisis is even more marked than the combined death-rate.

A very considerable part of the improvement in the death-rate, therefore, has occurred under Respiratory Disease.

The fluctuations in this death-rate, however, which occur from one year to another make it necessary to observe some caution in accepting recent figures as representing what we may expect in the near future.

We have accounted, then, for about one-halt of the great reduction in the death-rate which has occurred within the past 15 years. As we have seen this improvement is not in the diseases incidental to advanced years, although, with a population of which the average age is steadily increasing, a stationary death-rate from Heart Disease is compatible with a real improvement in affections of the circulation.

Nor can a large proportion of it be accounted for under the head of Zymotic Diseases.

It is probable that in recent years the reduction in the consumption of alcohol has produced some effect, although we should have expected this to be apparent under Diseases of the Nervous and Circulatory Systems.

There can be little doubt that the average circumstances of working-class families have improved, while much good work has been done in the improvement of housing and drainage. There is thus a greater average resistance to disease. The conditions of work have also gradually changed, and workshops generally have improved.

It is, however, notable that the improvement has been accelerated since 1902, and it is not at all unlikely that a serious factor in the recent advance has been the reduction of infection owing to the efforts made to reduce expectoration in enclosed places, whether in the home or in the workshop.

It would involve too much discussion if we were at present to follow the items of improvement still unaccounted for to their numerous sources.

It does, however, appear desirable to direct attention to Table N in the Appendix, which offers a comparison between the death-rates of the different divisions of the City at different ages and from various causes. We note there how the death-rate from Phthisis in the Manchester Township goes on accumulating from one period of life to the next until at ages 45–64 years it is 7·09 per 1000, more than three times as great as the death-rate in North Manchester at the same period of life. The same excess in the death-rate is manifested under other Respiratory Diseases, and a smaller, though still great, excess from Heart Disease.

The excess is, no doubt, the result of deep poverty in a large measure, and is a combined product of imperfect faculty, excesses, and insufficiency of nutriment.

In proportion, therefore, as the elements of the population which have these death-rates diminish, and as a fairly well-to-do population extends in North and South Manchester under better sanitary conditions than of old, the general death-rate is bound to diminish.

This accounts for a portion of the decline in the death-rate, but not for the greater part of it, since this decline is no less clearly marked in the Manchester Township than in the outer divisions.

As has previously been observed, the immense improvement which has occurred is partially obscured by the continued high infantile death-rate, though, even so, the total death-rate is conspicuously lowered, especially perhaps in North Manchester.

In order, however, that the improvement may be fully appreciated, the death-rates at different periods of life will be given for 1891 and some years following, and also for the last five years, in each of the main divisions of the City.

Death-rates at all ages, and at six age periods—Manchester Township.

Year	All ages	0–4	5–14	15–24	25–44	45 64	65 +
1891	32·03	108·59	5·57	6·32	17·47	51·09	152·81
1892	29·99	101·47	6·17	6·30	15·72	47·33	143·34
1893	30·23	105·85	4·73	5·88	17·09	44·89	144·64
1894	25·27	78·24	5·34	5·25	15·28	40·04	132·04
1895	31·59	106·24	5·42	6·50	18·16	49·08	150·49
....	....	....	....	....	....	....	....
1902	25·13	76·76	4·66	4·80	14·61	44·67	102·41
1903	25·26	87·03	4·69	4·29	13·14	40·28	105·60
1904	26·75	94·11	4·59	5·24	13·15	40·11	121·50
1905	24·39	83·02	4·40	4·30	12·47	38·76	107·98
1906	26·99	95·48	4·49	4·89	13·62	38·40	131·02

South Manchester, exclusive of Withington and Moss Side.

Years	All ages	0–4	5–14	15–24	25–44	45–64	65+
1891	24·43	80·68	4·62	5·50	13·23	37·34	130·06
1892	21·30	71·47	3·94	5·34	11·10	33·20	106·35
1893	23·02	81·24	4·66	4·78	11·57	32·72	121·68
1894	18·89	65·08	3·12	4·22	10·44	27·34	97·56
1895	23·02	85·78	4·09	4·76	10·32	32·61	111·91
....	....	....	....	....	....	....	....
1902	19·19	61·88	4·16	4·47	9·54	31·83	98·33
1903	19·31	72·24	3·44	4·32	8·53	27·63	99·20
1904	20·51	77·11	3·58	3·88	8·51	30·00	111·83
1905	18·62	55·41	3·43	3·40	7·56	26·65	97·84
1906	19·41	62·04	3·46	3·25	8·27	26·06	100·62

The figures for 1905 and 1906, except the Death-rates at all ages, refer to the extended South Manchester.

North Manchester.

Years	All Ages	0–4	5–14	15–24	25–44	45–64	65 +
1891	21·62	72·23	4·24	5·16	10·94	32·16	121·13
1892	18·77	63·50	3·82	4·33	9·66	26·97	103·79
1893	19·77	68·45	4·46	4·16	9·24	29·14	107·20
1894	15·52	50·48	3·53	4·26	8·19	21·76	87·78
1895	19·53	70·62	4·12	4·50	8·32	27·38	105·84
....	....	....	....	....	....	....	....
1902	17·22	59·38	3·67	3·95	7·95	26·75	97·39
1903	15·20	53·15	3·35	3·49	6·54	23·51	87·13
1904	17·12	61·04	3·26	3·75	7·97	25·81	94·90
1905	14·89	48·79	3·04	3·64	6·53	23·96	95·41
1906	15·71	54·48	3·45	2·57	6·98	24·79	95·18

It has appeared desirable that the great advance in life saving since 1891, especia at the middle period of life, should be here put on record. It means an immer access of wealth to the City, and also a great addition to the general sum of happiness.

A full consideration of the causes of this beneficent change must be postponed to a futu occasion.

INFECTIOUS DISEASES.

The diseases included in the Infectious Disease (Notification) Acts, 1889 and 18 are as follows: Smallpox, Scarlet Fever, Diphtheria, Membranous Croup, Typhus Fev Enteric or Typhoid Fever, Relapsing Fever, Continued Fever, Puerperal Fev Erysipelas, and Asiatic Cholera. The following cases were notified in 1906 and in t ten previous years, and the year 1906 is compared with the average of the previous t years:—

	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	Aver'ge for 10 Years	19
Smallpox	1	...	...	2	3	1	27	422	134	6	60	
Scarlet Fever ...	2,389	1,790	897	1,467	2,507	2,692	2,282	2,012	2,063	1,975	2,007	3,0
Diphtheria..... Memb. Croup	239	150	196	248	337	457	422	620	474	530	367	5
Typhus Fever ...	1	2	...	3	5	39	...	...	...	...	5	..
Enteric Fever ...	513	503	642	381	378	359	378	387	325	345	421	3
Relapsing Fever	...	...	...	...	...	...	...	...	...	...	...	
Puerperal Fever	25	49	44	35	49	55	47	30	42	82	46	1
Erysipelas	...	...	...	...	177	318	253	291	266	351	†276	3
	3,168	2,494	1,779	2,136	3,456	3,921	3,409	3,762	3,304	3,289	3,182	4,5

† Average 6 years.

It will be noted from the above report that Smallpox shows signs of revival both in 1905 and 1906, and that we cannot rely on a long interval such as that which occurred between 1895 and 1902.

The wave of Scarlet Fever is at present ascending, and promises to be greater than the previous one, which showed a much less decline in 1905 than the corresponding decline in 1898.

Diphtheria, also, has attained much greater dimensions in recent years than during the years 1896–1900.

Enteric Fever continues to show a diminished incidence.

Puerperal Fever, also, has increased. This increase is partly due, in all probability, to increased notification of cases. That this is not entirely accountable for the increase appears to be shown by the increased number of cases of Erysipelas reported.

The number of deaths for eleven years from the more common diseases is shown in following table, 1906 being compared with the average of the previous ten years :—

From	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	Aver'ge for 10 Years	1906
Measles	567	628	271	699	254	292	242	345	425	231	395	475
Scarlet Fever ...	198	124	65	46	105	127	146	97	85	78	107	108
Diphtheria..... Memb. Croup	83	46	51	85	101	133	123	136	99	127	98	119
Enteric Fever ...	118	95	120	73	75	75	66	93	66	55	84	83
Smallpox	...	...	...	...	...	...	...	24	9	...	3	...
Influenza	53	107	64	219	239	99	80	62	97	95	112	90
Whooping Cough	359	299	170	227	371	224	242	213	280	195	258	193
	1,378	1,299	741	1,349	1,145	950	899	970	1,061	781	1,057	1,068

From this Table we perceive that a progressive increase has occurred in the fatality from Measles since 1902. Scarlet Fever, also, shows increased fatality. If we except 1903, Enteric Fever has a higher fatality in 1906 than in any year since 1898.

Influenza stands comparatively low, while the number of deaths from Whooping Cough is lower than in any year since 1898.

SMALLPOX.

During the year 1906 five cases of Smallpox occurred.

The disease first made its appearance in Fallowfield in one family, into which it was introduced at a seaside resort.

Cases 1, 2, and 3 all occurred in one house, and comprised father and two daughters.

All three were unvaccinated.

The disease commenced in a daughter aged 5, and subsequently the father and sister were infected. These latter two were removed to hospital. The other daughter was left at home, as she had quite recovered.

Case 4—Male, æt. 41. Onset November 16th, 1906. No contact between this and the three previous cases could be established.

There was a history of having visited a fair in a neighbouring town on November 3rd. Smallpox was present in this town at that time.

Case 5 was notified on December 17th.

The Medical Officer of Health, on visiting this case, considered the diagnosis doubtful. The patient was permitted to remain at home, and as a precautionary measure the members of the family were revaccinated.

	District	Sex	Age	Rash 1906	Admitted	Discharged	Type	Vaccination: Number	Vaccination: Area	Occupation	Complications in Hospital
1	Rusholme ..	F	5	10 X.	....	....	Discrete Mild	None	—	....	Not admitted
2	,, ..	M	37	24 X.	5-II-06	23-II-06	,,	None	—	Salesman	None
3	,, ..	F	8	25 X.	5-II-06	23-II-06	,,	None	—	....	None
4	Bradford ..	M	41	21 XI.	22-II-06	14-I2-06	,,	4 Infancy	$\frac{1}{16}$	Iron Borer	None
5	Rusholme ..	F	59	29 XI.	....	....	?	Infancy	—	Housewife	Not admitted

B. K. Goldsmith, M.B., D.P.H.

SCARLET FEVER.

I beg to present the following facts relating to Scarlet Fever in the City of Manchester during the year 1906:—

The total number of cases notified was 3,075.

Table 1 shows the attacks in weeks.

The disease was most prevalent, as is usual, in the 4th quarter.

A rise occurred in the 36th week, and the number of cases notified weekly continued high till the 50th week.

The maximum of the year was reached in the 44th week.

TABLE 1.—SCARLET FEVER, 1905.—ATTACKS IN WEEKS ACCORDING TO DATE OF RASH.

First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Jan. 6	52	April 7	38	July 7	62	Oct. 6	85
,, 13	45	,, 14	35	,, 14	60	,, 13	94
,, 20	32	,, 21	36	,, 21	75	,, 20	77
,, 27	49	,, 28	37	,, 28	52	,, 27	92
Feb. 3	41	May 5	47	Aug. 4	51	Nov. 3	118
,, 10	61	,, 12	43	,, 11	41	,, 10	107
,, 17	54	,, 19	31	,, 18	54	,, 17	101
,, 24	58	,, 26	38	,, 25	41	,, 24	98
Mch. 3	42	June 2	40	Sept. 1	57	Dec. 1	84
,, 10	34	,, 9	43	,, 8	74	,, 8	86
,, 17	34	,, 16	62	,, 15	73	,, 15	83
,, 24	27	,, 23	47	,, 22	69	,, 22	68
,, 31	33	,, 30	52	,, 29	105	,, 29	57
Total...	562	Total...	549	Total...	814	Total...	1150

City Total, 3,075.

TABLE 2.—SCARLET FEVER ATTACKS, 1906.—RATES PER 1,000 LIVING, AS COMPARED WITH MEAN OF FIVE YEARS.

	1901	1902	1903	1904	1905	Mean	1906
Twelve Towns *	5·07	5·80	4·34	3·93	4·61	**4·75**	4·54
City of Manchester	4·93	4·15	3·63	3·69	3·35	**3·95**	5·17
Manchester Township	3·66	3·07	3·18	2·89	2·74	**3·11**	5·75
North Manchester	5·30	5·09	4·27	4·49	3·46	**4·52**	6·69
South Manchester	5·37	4·09	3·43	3·55	3·55	**4·00**	3·89

* These are Blackburn, Bolton, Bradford, Burnley, Huddersfield, Hull, Leeds, Lincoln, Oldham, Preston, Salford, and Sheffield.

During the last 20 years the numbers of attacks per 10,000 living are as follows :—

Year.....	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896
	47	38	35	51	48	50	58	43	39	44
Year.....	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
	33	16	27	46	49	42	36	37	34	51

The year 1898 formed the bottom of the last wave of incidence, and the year 1901 its crest.

Since then there has been a gradual decline in incidence to a minimum in 1905. This has been followed by a rapid rise in 1906.

A similar rise occurred in the year 1890.

It will be seen that there is a very considerable increase in the number of cases notified in 1906 as compared with last year.

TABLE 3.—1906—SCARLET FEVER ATTACKS IN DISTRICTS, WITH ATTACK RATE, CASE FATALITY PER CENT., AND REMOVALS TO HOSPITAL PER CENT.

DISTRICTS	ATTACKS	ATTACK RATE PER 1,000 LIVING	CASE FATALITY PER CENT.	REMOVALS TO HOSPITAL PER CENT.
Ancoats	294	6·75	5·4	77·9
Central	60	2·27	5·0	78·4
St. George's	382	6·58	3·9	72·5
Cheetham	236	5·76	0·8	76·3
Crumpsall	45	4.84	2·2	62·2
Blackley	82	8·57	3·7	62·3
Harpurhey	157	7·48	1·9	56·7
Moston	165	9·21	4·2	52·7
Newton Heath	348	9·03	4·3	62·9
Bradford	93	3·72	4·3	66·7
Beswick	63	5·09	3·2	81·0
Clayton	64	5·12	4·7	53·1
Ardwick	137	3·10	2·2	65·7
Openshaw	153	5·35	5·2	54·3
Gorton (West)	218	6·88	1·8	66·4
Rusholme and Kirk.....	111	4·21	4·5	46·9
Chorlton-on-Medlock	185	3·28	5·9	71·9
Hulme	207	3·23	2·9	68·6
Moss Side	76	2·70	No deaths	55·3
City of Manchester ...	**3,075**	**5·17**	**3·6**	**66·3**

This table shows that the attack rate has been highest in Moston, Newton Heath, Blackley, Harpurhey, Ancoats, St. George's, and West Gorton.

The highest case fatality is in the poorer districts, as has been the case in former years.

The case fatality per cent., though very slightly higher than in 1905, is below the average for the last five years.

Year.....	1901	1902	1903	1904	1905	1906
Case fatality per cent. ..	4·6	6·2	4·7	4·1	3·5	3·6

Table 4

Gives the age distribution of 24,606 cases of Scarlet Fever, and shows the case fatality per cent. at different ages.

This is greatest in the first year of life, and declines rapidly up to the age period 10–15, after which age an attack of Scarlet Fever appears to be attended with increased risk.

Scarlet Fever.—Number of attacks, of deaths, and case fatality per cent. at different ages, for the ten years 1896-1905, and for 1906.

Ages	1896-1905			1906		
	Attacks	Deaths	Case Fatality per cent.	Attacks	Deaths	Case Fatality per cent.
Under one year ...	289	63	21·8	20	1	5·0
1 to 2 years ...	883	148	16·8	78	6	7·7
2 to 3 ,, ...	1,736	230	13·3	175	17	9·7
3 to 4 ,, ...	2,263	247	11·2	254	19	7·5
4 to 5 ,, ...	2,604	211	8·1	311	18	5·8
5 to 6 ,, ...	2,627	112	4·3	269	6	2·2
6 to 7 ,, ...	2,394	85	4·4	346	14	4·0
7 to 8 ,, ...	2,128	59	2·8	256	4	1·6
8 to 9 ,, ...	1,759	33	1·9	225	5	2·2
9 to 10 ,, ...	1,465	28	1·9	194	3	1·5
10 to 15 ,, ...	4,093	62	1·5	599	11	1·8
15 to 20 ,, ...	1,210	30	2·5	192	4	2·1
20 to 25 ,, ...	556	9	1·6	62	1	1·6
25 to 35 ,, ...	449	13	2·9	71	2	2·8
35 to 45 ,, ...	114	4	3·5	18	...	...
45 to 55 ,, ...	31	2	6·5	5	...	...
55 to 65 ,, ...	5	...	...	...	...	...
Over 65 ,, ...	...	...	...	...	...	...
All Ages	24,606	1,336	5·4	3,075	111	3·6

TABLE 5.—SCARLET FEVER MORTALITY, 1906.—RATE PER 1000 LIVING, COMPARED WITH MEAN OF FIVE YEARS.

	1901	1902	1903	1904	1905	Mean	1906
England and Wales.....	0·13	0·19	0·12	0·11	0·11	**0·13**	0·10
* 76 Great Towns	0·17	0·19	0·14	0·12	0·13	**0·15**	0·12
London.....	0·13	0·12	0·08	0·08	0·12	**0·11**	0·11
Manchester City.....	0·23	0·27	0·17	0·15	0·13†	**0·19†**	0·19†
Manchester Township	0·24	0·21	0·14	0·17	0·15	**0·18**	0·27
North Manchester	0·25	0·31	0·21	0·16	0·10	**0·21**	0·20
South Manchester	0·22	0·26	0·17	0·14	0·15†	**0·19†**	0·14†
* 142 Smaller Towns	0·14	0·14	0·12	0.13	0·11	**0·13**	0·09
Rural Districts.....	0·10	0·10	0·10	0·09	0·09	**0·10**	0·08

* The rates for 1901 and previous years are for the 33 Great Towns and 67 Smaller Towns, and for 1902-3 for 103 Smaller Towns. † Exclusive of Moss Side and Withington.

It will be seen that there is an increase in the death-rate from Scarlet Fever during 1906 as compared with 1903, 1904, and 1905, and that the rate is equal to the mean of the last five years.

The case fatality per cent. of those attacked, however, is considerably below the average for the previous five years, as shown under Table 3.

TABLE 6.—SCARLET FEVER.

		1891	1892	1893	1894	1895	1896	1897	1898
Township.	Removal to Hospital, per cent.	72·3	71·1	76·3	79·1	82·0	83·5	89·2	85·8
	Death-rate per 1,000...	0·22	0·35	0·23	0·26	0·37	0·41	0·27	0·11
Entire City.	Removal to Hospital, per cent.	61·1	58·5	58·6	66·0	71·3	73·9	79·7	73·1
	Death-rate per 1,000...	0·22	0·27	0·27	0·22	0·33	0·37	0·23	0·12
		1899	1900	1901	1902	1903	1904	1905	1906
Township.	Removal to Hospital, per cent.	87·2	88·0	88·5	88·8	91·9	88·6	82·3	75·1
	Death-rate per 1,000...	0·08	0·16	0·24	0·21	0·14	0·17	0·15	0·27
Entire City.	Removal to Hospital, per cent.	74·4	80·9	82·3	81·2	83·4	79·8	72·9	66·3
	Death-rate per 1,000...	0·08	0·19	0·23	0·27	0·17	0·15	0·13	0·19

RETURN CASES OF SCARLET FEVER.

As in former years, all subsequent cases occurring in houses after the return of a Scarlet Fever patient from hospital to that house are noted.

The total number of such cases is 137.

Where more than one case arose in the same house subsequent to the return of a convalescent patient, each case is counted as a separate return case. In ten instances two or more persons were attacked by Scarlet Fever subsequent to the return of the supposed originating case.

Particulars as to duration of stay in hospital, complications in hospital, and complications reported to have been present on, or to have developed after, return home of the previous case are obtained in every instance; also the degree of contact between the primary and subsequent case or cases.*

The following table shows the interval in days between the return home of the primary case and the rash of the subsequent case for the years 1904 and 1905, and also the same for 1906, except that in the case of 1906 the interval is reckoned to the day of onset in the subsequent case :—

Days	-7	-14	-21	-31	-41	-51	-61	-71	-81
1904	47	38	23	13	11	6	..	..	..
1905	17	24	11	13	1	4	2	3	1
1906	44	49	16	9	9	6	2	2	..

SCHOOLS AND SCARLET FEVER.

In a special report to the Medical Officer of Health, I have discussed this subject in detail, and the conclusion arrived at from an analysis of 19,219 cases of Scarlet Fever in Manchester was that schools do exert a definite influence in the spread of this disease.

This influence may not be very great, but it exists, and is by no means a negligible factor in the spread of the infection of Scarlet Fever.

As a further result of the enquiry, evidence is produced to show that the most usual period of incubation in Scarlet Fever is two or three days—more especially two days. This incubation period coincides closely with that shown to occur by Murchison, Gee, Gendron, Squire, and others, in published accounts of cases of Scarlet Fever occurring after a single contact with a known case of that disease.†

* Owing to lack of space this table of particulars is omitted.

† Transactions of the Clinical Society.

For the purpose of my investigation, the cases of Scarlet Fever were divided into three age groups, viz., 0–3, 3–13, and 13 and onwards.

Attention was first directed to the day of the week on which the maximum number of onsets occurred in each group.

In the 0–3 age period, it was found that the maximum number of onsets occurred on Sunday and Monday, and the minimum on Thursday.

In school children, however (3–13), Friday and Saturday are the days on which most cases occur, fewest arising on Tuesday and Wednesday.

As far as school children are concerned, these facts refer to the period only during which the schools are open.

During the holidays, both summer and winter, this order no longer obtains; the onsets are more evenly distributed over all the days of the week.

These results accord with what one would expect if schools do exercise an influence in the spread of infection.

Sir Shirley Murphy, in his reports to the London County Council, has approached this question from another point of view. The method adopted was to ascertain the number of cases occurring during the holidays, and compare such with the number occurring during a corresponding period of time before and after the holidays.

In his report for 1894, Sir Shirley states "that at each age there was a decrease in the number of cases during the holidays, but that this decrease was most manifest in children at the school age."

Again, while there was a decrease after the holidays among children under three and among adults (over 13), the number of cases among children of school age increased by 33·5 per cent.

Examination of the figures relating to Municipal Schools in Manchester fully confirm the results in London.

The fall in the number of cases during the holidays is not an abrupt one, but rather a gradual diminution occurs in the daily number of onsets (subject to occasional exacerbations), reaching a minimum at or immediately after the end of the holidays.

The rise after the holidays on the other hand is abrupt, and is seen to occur in from three to five days after the schools re-open.

This rise is then maintained.

As already mentioned, during the holidays there is an alteration in the relative positions of the days of the week (in regard to the number of onsets) as compared with that seen during the period of school attendance.

Those engaged in public health work and school medical work must be fully aware of the frequency with which overlooked and wilfully suppressed cases of Scarlet Fever occur. Many of such cases are detected only by the occurrence of subsequent cases in the same house or school, causing a strict enquiry to be instituted. One cannot believe, however, that all such overlooked or suppressed cases are detected, and they in consequence continue to spread the disease.

During the year 1906, no less than 229 overlooked or suppressed cases of Scarlet Fever were ascertained Of these, many were attending school during some portion or other of their illness.

From these 229 cases, either directly or indirectly, 139 subsequent cases were known to be infected, and it is reasonable to suppose that more were infected, though the source of infection could not be definitely traced.

This report was placed before the Hospitals Sub-Committee, and permission was accorded to publish it in one of the Medical Journals. It was, accordingly, sent to the *Lancet,* and published in their issue of June 29th.

B. K. Goldsmith, M.B., D.P.H.

DIPHTHERIA.

I beg to submit the following particulars regarding cases of Diphtheria and Membranous Croup in Manchester during the year 1906.

The total number of cases notified was 551, an increase of 21 over the year 1905.

The following table shows the number of cases notified each year for the last 10 years :—

1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
150	196	248	337	457	422	620	474	530	551

The disease was most prevalent in the 4th quarter of the year, as seen in Table I.

TABLE I.

DIPHTHERIA, MEMB. CROUP, 1906.—ATTACKS IN WEEKS, ACCORDING TO DATE OF ONSET.

FIRST QUARTER		SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER	
Jan. 6	10	April 7	8	July 7	10	Oct. 6	15
,, 13	9	,, 14	9	,, 14	8	,, 13	19
,, 20	4	,, 21	7	,, 21	9	,, 20	13
,, 27	13	,, 28	10	,, 28	10	,, 27	14
Feb. 3	11	May 5	6	Aug. 4	8	Nov. 3	22
,, 10	10	,, 12	3	,, 11	10	,, 10	24
,, 17	7	,, 19	6	,, 18	3	,, 17	13
,, 24	12	,, 26	8	,, 25	10	,, 24	16
Mch. 3	7	June 2	9	Sept. 1	15	Dec. 1	18
,, 10	6	,, 9	4	,, 8	9	,, 8	12
,, 17	11	,, 16	8	,, 16	11	,, 15	18
,, 24	8	,, 23	8	,, 22	14	,, 22	17
,, 31	8	,, 30	9	,, 29	11	,, 29	11
Total...	116	Total...	95	Total...	128	Total...	212

City total, 551.

TABLE II.

SHOWS THE ATTACK RATE PER 1000 LIVING FOR THE YEAR 1906, COMPARED WITH THE MEAN OF FIVE YEARS—DIPHTHERIA AND MEMBRANOUS CROUP.

	1901	1902	1903	1904	1905	Mean	1906
*Twelve Notification Towns ...	1·67	1·51	1·20	1·35	1·25	**1·40**	1·71
City of Manchester	0·84	0·77	1·12	0·85	0·90	**0·90**	0·93
Manchester Township.....	0·58	0·61	0·54	0·59	0·90	**0·64**	0·79
North Manchester	1·10	0·78	1·32	0·95	0·89	**1·01**	1·20
South Manchester	0·79	0·84	1·28	0·91	0·90	**0·94**	0·81

* These are in Lancashire and Yorkshire.

It will be seen that Manchester has a considerably lower rate of incidence than the twelve notification towns specified. This is true both for the year 1906 and for the mean of the five preceding years.

Table III.

Diphtheria, Memb. Croup, 1906.—Number of Attacks, of Deaths, and Case Fatality at Different Ages, for the Twelve Years 1894-1905, and for 1906.

Ages	1894-1905			1906		
	Attacks	Deaths	Case Fatality*	Attacks	Deaths	Case Fatality*
Under one year ...	139	90	64·7	16	12	75·0
1 to 2 years ...	379	204	53·8	39	23	59·0
2 to 3 „ ...	396	183	46·2	55	17	30·9
3 to 4 „ ...	525	194	36·9	66	17	25·7
4 to 5 „ ...	498	159	31·9	69	9	13·0
5 to 6 „ ...	438	133	30·4	56	12	21·4
6 to 7 „ ...	295	69	23·4	49	10	20·4
7 to 8 „ ...	251	54	21·5	29	2	6·9
8 to 9 „ ...	216	46	21·3	24	2	8·3
9 to 10 „ ...	167	22	13·2	18	4	22·2
10 to 15 „ ...	454	35	7·7	65	1	1·5
15 to 20 „ ...	222	11	5·0	19	3	15·8
20 to 25 „ ...	198	5	2·5	16	...	...
25 to 35 „ ...	261	10	3·8	19	2	10·5
35 to 45 „ ...	97	4	4·1	5	...	...
45 to 55 „ ...	34	2	5·9	6	2	33·3
55 to 65 „ ...	11	1	9·1	...	...	...
Over 65 „ ...	6	...	...	...	...	...
All ages	4587	1222	26·6	551	116	21·1

* The percentages in this column are the actual proportions of fatal cases to the attacks at those ages.

From this table it will be seen that, as regards attacks at different ages, the largest number have occurred at ages 3–4 and 4–5. The case fatality per cent., however, is not greatest at these ages, but in the earliest years of life.

In 1906 the case fatality for all ages was 21·1 per cent., an improvement over that for 1905, viz., 22·4 per cent., and the following figures show that there has been a marked improvement in the case fatality during the last 10 years:—

1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
32·7	28·5	33·9	29·0	28·8	29·4	21·9	20·7	22·4	21·1

Table IV.

Diphtheria and Membranous Croup, 1906.—Attacks in Districts, with Attack Rate, Case Fatality per cent., and Removals to Hospital per cent.

	Districts	Attacks	Attack Rate per 1000 living	† Case Fatality per cent.	Removals to Hospital per cent.
Township	Ancoats	27	0·62	25·9	66·7
	Central	24	0·91	33·3	79·2
	St. George's	50	0·86	24·0	48·0
North	Cheetham	80	1·95	5·0	51·2
	Crumpsall	20	2·15	15·0	5·0
	Blackley	18	1·88	22·2	27·8
	Harpurhey	21	1·00	23·8	33·3
	Moston	16	0·89	12·5	25·0
	Newton Heath	31	0·81	25·8	58·1
	Bradford	6	0·02	66·7	50·0
	Beswick	9	0·73	44·4	44·4
	Clayton	24	1·92	20·8	54·2
South	Ardwick	24	0·54	12·5	50·0
	Openshaw	25	0·87	56·0	56·0
	Gorton (West)	13	0·41	23·1	23·1
	Rusholme and Kirk.	39	1·48	5·1	28·2
	Chorlton-on-Medlock	54	0·96	25·9	46·3
	Hulme	55	0·86	16·4	60·0
	Moss Side	15	0·53	33·3	40·0
	City of Manchester	**551**	**0·93**	**21·1**	**47·4**

† Corrected : the fatal cases are those actually occurring amongst the cases notified.

From this we see that in so far as the three main divisions of Manchester are concerned, the attacks were distributed as under :—

Manchester Township	101
North Manchester	225
South Manchester	225

The attack rate per 1000 living was highest in Crumpsall, Cheetham, Clayton, Blackley, and Rusholme.

Table V. shows the mortality from Diphtheria and Membranous Croup in Manchester as compared with other parts of the country. It will be seen that the mortality for Manchester City is the same as that for England and Wales generally, and that it is below the mortality figure of the 76 great towns and the mean of Manchester for the preceding five years.

Table V.

Diphtheria, Memb. Croup Mortality, 1906.—Rate per 1000 living compared with mean of five years.

	1901	1902	1903	1904	1905	Mean	1906
England and Wales	0·27	0·23	0·18	0·17	0·16	**0·20**	...
*76 Great Towns	0·30	0·26	0·20	0·19	0·16	**0·22**	...
London	0·30	0·25	0·16	0·16	0·12	**0·20**	...
Manchester City	0·24	0·22	0·25	0·18	†0·22	**0·22**	†0·20
Manchester Township	0·16	0·19	0·16	0·13	0·25	**0·18**	0·21
North Manchester	0·30	0·21	0·26	0·22	0·19	**0·24**	0·22
South Manchester	0·25	0·25	0·28	0·17	†0·22	**0·23**	†0·18
*141 Smaller Towns	0·28	0·24	0·16	0·16	0·15	**0·20**	...
Rural Districts	0·24	0·20	0 17	0·14	0·15	**0·18**	...

* The rates for 1901 are for the 33 Great Towns and 67 Smaller Towns; and for 1902 and 1903, 103 Smaller Towns. † Exclusive of Moss Side and Withington.

From a table given at the commencement of this section, it might appear that Diphtheria is increasing at a very rapid rate in Manchester.

The increase may not be so great, however, as that indicated by these figures.

There can be no doubt that a considerable portion of the apparent increase can be accounted for by the improved methods of diagnosis now available.

Medical practitioners have been frequently invited to avail themselves of the opportunity afforded for examination of swabs at the Public Health Laboratory, and by this means many cases are now proved to be Diphtheritic which previously would have been diagnosed as suffering from Follicular Tonsillitis, etc.

Further, a considerable number of contacts who have given positive swabs are included in the number of cases occurring in later years.

From 1896 to 1906 (both inclusive) in the City of Manchester, 5,138 cases of Diphtheria and Membranous Croup at all ages have been notified. Of these, 1,615, or 31·4 per cent., occurred in children under four years of age. This is a very high proportion to the total number of cases at all ages.

The great majority of children at this age do not attend school, and, as a rule, their range of movement is small, and in consequence the amount of contact with individuals other than members of their own family is correspondingly limited.

It would appear necessary, therefore, to look to the other members of the family as the probable sources of infection in the event of Diphtheria occurring in an infant, and particularly to those members attending school.

Careful enquiry may elicit some history of recent sore throat in one or more of the older members of the family.

Further enquiries should be made as to recent nasal discharge, more especially if blood-stained, or to any history of glandular swelling in the neck, as such may be the only indication of Diphtheria—a disease not necessarily accompanied by sore throat.

Where a patient is being nursed at home, and there is a history of recent sore throat, etc., in any other member of the family, the medical attendant is written to, and requested to take a swab for examination. A fee is paid for such services.

Where the patient has been removed to hospital, the swabs are taken in certain instances by the assistant to the Medical Officer of Health.

In the event of the swabs showing the presence of Diphtheria bacilli, the case is treated as one of Diphtheria.

In a certain proportion of cases, however, no history of any recent illness in other members of the family can be obtained.

I append a list of cases of Diphtheria in infants illustrating a history of antecedent or concurrent illness in other members of the family.

All occurred during the year 1906, and the majority were discovered on enquiry being made into the source of infection in the infant.

Case No. 32—F. 5 years. Onset January 22nd, 1906. Sister 7 years. Had a sore throat two weeks before. These children slept together.

,, 51—F. 3 years. Onset February 1st. Sister 7 years. Sore throat, languid, January 30th.

,, 59—M. 3 years. Onset February 14th. Swab +. Brother 5 years. Onset February 10th (Case 56). Brother 1 year 10 months. Onset February 21st (Case 64). Sister $2\frac{1}{2}$ years. Onset February 21st (Case 66).

,, 68—F. 3 years. Onset February 17th. Swab +. Mother had sore throat, February 17th.

Case No. 110—F. 2 years. Onset March 29th. Sister of 68. A sister age 5 years, a scholar, shows signs of old nasal discharge and excoriation. Swab +.

,, 83—M. 3 years. Onset February 22nd. Played with a Diphtheria case on February 20th.

,, 96—M. 3½ years. Onset March 11th. Father off work with sore throat and headache, March 6th. Mother (Case 97). Onset March 13th.

,, 111—F. 4 years. Onset March 29th. Swab +. A friend age 7 years on a visit to the house had old-standing nasal discharge on arrival. Swab requested. Medical attendant refused.

,, 124—M. 6 months. Onset April 7th. Swab +. Brother 4 years. Onset April 1st. Swab +.

,, 130—M. 1 year 4 months. Onset 19th April, 1906. Swab +. Brother age 5 years, a scholar, has N.D. and swollen glands. Onset prior to Case 130. Notified later. Swab +.

,, 120—F. 2 years 10 months. Onset March 27th. Swab +. F. 6 years. Onset April 12th. M. 2 years 10 months. Onset April 17th. At time of Inspector's visit to first case, it was found that a brother, age 11 years, was complaining of a sore throat. Swab negative. All are of the same family.

,, 155—F. 3 years. Onset May 8th. Mother had a sore throat one week before.

,, 170—M. 3 years. Onset May 25th. Swab +. Sister 7 years. Removed to hospital with Diphtheria on May 25th. Swab +.

,, 189—M. 1 year 8 months. Onset June 16th. Swab +. Brother 8 years. Ill before (Case 189). Swab asked; result +. Notified later (Case 190).

,, 192—F. 3 years. Onset June 16th. Brother, age 5 years, had thin nasal discharge and excoriation of the nares, with enlarged glands in the neck, prior to the onset of Case 192. Swab asked; result + (Case 201). Father. Onset June 29th (Case 204).

,, 197—M. 4½ years. Onset June 12th. Swab +. Father had a sore throat 14 days before.

Case No. 206—M. 2 years 3 months. Onset June 30th. Swab +. The mother and a servant had sore throats during the week prior to onset in Case 206. Swab from mother negative. Servant had left before a swab could be obtained.

,, 260—F. 2 years. Onset August 10th. Sister, age 5 years, a scholar, had sore throat, nasal and ear discharge, on August 2nd.

,, 283—M. 2 years. Onset 31st August. Father had sore throat four weeks before, and a brother, age 6 years, had a similar complaint a few days prior to onset of Case 283. Swab +. Notified later.

,, 310—F. 3 years. Onset September 19th. Swab +. Sister 6 years. Onset September 11th (Case 300). These two slept together.

,, 348—F. 1 year. Onset October 10th. Died. Mother had sore throat two weeks before. Brother 6 years, a scholar, had a sore throat, accompanied by swollen glands, on September 26th. Refused to allow medical attendant to take swabs.

,, 385—M. 2 years. Onset 30th October, 1906. Swab +. Brother 3 years. Onset 21st October, 1906. Swab +. Original case could not be traced.

,, 413—F. 1½ years. Onset November 8th. Mother had sore throat, swollen glands, and N.D. prior. Swabs asked. Medical attendant declined.

,, 414—M. 5 years. Onset November 8th. F. 1 year 10 months. Onset November 10th. Enquiry elicited the fact that practically the whole of this family had suffered from Diphtheria, starting with:—

F. 15 years.	Onset	November	4th.	Swab	negative.
M. 7 ,,	,,	,,	5th.	,,	+.
F. 16 ,,	,,	,,	5th.	,,	+.
M. 10 ,,	,,	,,	6th.	,,	+.
M. 21 ,,	,,	,,	11th.	,,	+.

,, 418 M. 1 year 4 months. Onset November 6th. Swab +. Sister 4 years. Onset November 4th. Brother 6 years, scholar. Onset November 4th.

,, 427—F. 4 years. Onset November 14th. Swab +. Brother 8 years, scholar, sick and shivering, November 9th.

,, 444—F. 3 years. Onset November 23rd. Brother 5 years, scholar. Onset November 15th. Swab +

Case No. 490—M. 3 years. Onset December 16th. Sister 8 years. Sore throat, headache, and swollen glands on December 11th. Specimen negative.

,, 496—F. 3 years 9 months. Onset November 28th. Swab +. Father, mother, and two brothers, age 10 and 7 years, and a twin sister, have all had sore throats. The father was the first to be ill.

These cases, selected from the Diphtheria sheets for 1906, illustrate the necessity for a careful examination into the history of members of the family in the event of Diphtheria occurring in an infant.

In previous reports of the Medical Officer of Health, reference has been made to the distribution of Diphtheria and Membranous Croup in Manchester.

Below is given the mean incidence rate per 1000 living in the different divisions of Manchester during the years 1894–1906 :—

City of Manchester	0·71
Manchester Township	0·52
North Manchester	0·90
South Manchester	0·67
Twelve Notification Towns	1·20

From this it is seen that North Manchester has a very high incidence rate as compared with the other two divisions. Further investigation shows that particular sub-divisions of North Manchester have been more especially invaded, as will be seen from the following table :—

Mean Incidence Rate per 1000 living of Diphtheria and Membranous Croup during the 13 years 1894–1906—North Manchester.

Cheetham	1·44
Crumpsall	1·56
Blackley	1·09
Moston	0·84
Clayton	0·84
Harpurhey	0·73
Newton Heath	0·67
Bradford	0·58
Beswick	0·43

These rates are corrected according to the Census return, 1901.

This table shows that Diphtheria is much more prevalent in Crumpsall, Cheetham, and Blackley than in the other sub-divisions of North Manchester.

In the first two this high incidence rate has obtained in each of the 13 years. Blackley, however, owes its high position mainly to a severe outbreak in 1903 in St. Peter's School.

The distribution of Diphtheria for 1906 is shown on the spot chart inserted opposite this page.

In districts where the attack rate is high, in many instances a common source of infection has been found. This has been most usually a school.

Diphtheria once introduced into a school or institution may pursue one of two courses. It may either run a very sharp course and then die out—comparatively rapidly—or, on the other hand, it may persist for an indefinite period, odd cases arising from time to time.

This occurrence is in all probability due to slight overlooked cases, or to healthy individuals harbouring Diphtheria bacilli, such individuals being capable of transmitting the disease.

In Cheetham and Crumpsall, Diphtheria has manifested a distinct tendency to persist in particular schools.

In the Annual Report of the Medical Officer of Health for 1899 reference is made to the marked tendency to overlook slight attacks of Diphtheria in Cheetham.

TABLE VII.

POPULATIONS, DEATHS, AND DEATH RATES IN GROUPS OF AGES, FOR THE WHOLE CITY AND EACH OF ITS MAIN DIVISIONS, FROM DIPHTHERIA AND MEMBRANOUS CROUP FOR THE YEARS 1896 TO 1906, BOTH INCLUSIVE.

Division ...	City				Township			
Population ... (1901 Census)	545292				135555			
	0–4	5–14	15+	Total	0–4	5–14	15+	Total
Deaths	739	318	33	1090	179	41	6	226
Death Rates ...	1·0446	0·2592	0·0081	...	1·0028	0·1450	0·0109	...

Division ...	North				South			
Population ... (1901 Census)	162132				247605			
	0–4	5–14	15+	Total	0–4	5–14	15+	Total
Deaths	249	132	8	389	311	145	19	475
Death Rates ...	1·1484	0·3418	0·0093	...	0·9944	0 2643	0·0117	...

1906.—DIPHTHERIA AND MEMBRANOUS CROUP.

IN THIS TABLE ARE INCLUDED ALL CASES, EXCEPT THOSE DIAGNOSED AT MONSALL AS NOT DIPHTHERIA.

	STATISTICAL DIVISIONS		January	February	March	April	May	June	July	August	September	October	November	December
I.	Ancoats	+	...	•	...	•••	...	...	...	...	••	••	•••••••	•
		† o	†	o	...	...	...	†	...	†o	†	†	oo	o
	Central	+	••	••••	...	•	...	...	...	••	•	...	••	••
		† o	...	††	...	...	...	†o	...	...	†o	...	oo	o
	St. George's	+	••	•••••	••••	...	...	•	•••••	••••	•••	•••	••••	•••
		† o	†† oo	o	†	...	†	...	†o	†	†	††	...	†† o
II.	Cheetham	+	•••••	•••••••	•	•	••••	••••	•••••••••	•••	•••••••	•••	•••••	•••••
		† o	† oo	...	†	††	...	†	†††	†† o	†o	† † oo	† † † o	† o o o
	Crumpsall	+	•••	...	...	...	...	•	...	•	•••	••	••	••
		o †	...	o	...	...	...	...	...	...	†	†	†	...
	Blackley	+	•	...	•	...	...	...	...	...	•••	••••	•••••	•
		† o	...	...	†	†	...	...	...	...	o	...	...	o
	Harpurhey	+	••	••	•••	...	•	•	•••	...	•••	•	...	•
		† o	...	...	o	...	...	...	...	...	...	†o	†o	...
	Moston	+	...	•	•	...	...	••	...	...	••	••••	•	••
		† o	...	...	...	...	...	...	...	...	†	oo	...	...
	Newton	+	•••	...	•	••	•••	...	•	...	•	••••	...	•••
		† o	†††	...	o	...	††	†	††	...	†o	...	...	oo
	Bradford	+	...	...	...	...	...	•	...	...	•	...	•	...
		† o	o	...	o	...	...	...	...	...	...	...	†	o
	Beswick	+	...	...	...	...	•	...	...	•	...	...	...	...
		† o	...	...	...	o	...	...	†	†	...	...	oo	o
	Clayton	+	•	...	...	•	...	...	...	••	•••	••••	•	•••
		† o	...	...	...	...	...	...	o	...	...	oo	†	ooo
II.	Ardwick	+	•	•	•	••	...	•	..	•	•	•	••••	•
		† o	...	...	† oo	...	..	...	...	††	††o	†	†	†
	Openshaw	+	...	•	•	••	••	...	•	...	•	•••••	...	•
		† o	...	...	o	o	...	...	...	...	...	o	oo	†† oooo
	West Gorton	+	•	•	...	•	...	•	...	•	...	•	••	•
		† o	...	†	...	...	...	†	...	...	...	...	o	†o
	Rusholme and Kirkmanshulme	+	•	•••	...	•	••	...	...	...	...	•••	•••••••••	•••••
		† o	†	†	...	o	...	...	†	†	...	...	†††	††
	Chorlton-upon-Medlock	+	•	••	•	••••••	••	•••••	••••	••	...	•••	•••	••
		† o	†o	†	††	†††	†††	...	o†	†	†o	oo	...	†oo
	Hulme	+	••••	••	••	••••••	••	••	••	•	••	•••••••	•	•
		† o	o	†o	†o	†o	†o	††††	†	†††	†	†	oo	†oo
	Moss Side	+	...	...	...	•	•	•	•	•	...	...	...	...
		† o	ooo	†	o	...	...	o	...	...	o	o	...	†

Bacteriological result. • Positive. † Negative. o None taken.

From this table we see that of the total deaths in the City of Manchester 318, or 29·1 per cent., occurred in children of school age.

Of the total deaths in the Township only 18·1 per cent. occurred in school children, as compared with 30·5 in South Manchester and almost 34 per cent. in North Manchester.

From an enquiry recently made into the Diphtheria history of all the schools in Manchester, it appears that the schools in Central Manchester enjoy comparative immunity from the disease, whereas certain schools in North and South Manchester—more particularly North—appear to be frequently invaded.

It is proposed to investigate this subject more fully in the immediate future.

B. K. Goldsmith, M.B., D.P.H.

To the Medical Officer of Health.

ENTERIC FEVER.

It has not been found possible to submit the Inspector's papers for 1906, with Mr. Hewitt's special investigations attached, to the same process of analysis and construction as they underwent for 1905.

It is hoped, however, that later on this may be practicable.

The cases notified during the first half of the year were subjected to a careful investigation by Inspector Hewitt; those in the third quarter scarcely at all, and those in the fourth quarter only partially. Owing to the smallness of the special staff, some part of the work relating to infectious disease is always suffering from want of adequate inquiry. In the case of Enteric Fever this is a great pity, as it is desirable to establish clearly the position which was taken up in the Report for 1905 as regards the modes of propagation of Enteric Fever in Manchester. This position was stated in these words:—

Extract Page 101—Report, 1905.

Conclusions.

1. Enteric Fever is spread in Manchester largely by failure to recognise the disease.

2. This failure is specially conspicuous in the case of children.

3. This disease has a fairly high infective capacity, especially where a number of people are gathered into one house. It is most manifest when children become attacked.

4. Medical practitioners need to be more on the alert to detect Enteric Fever in young children.

5. The value of skilled inquiry is conspicuously shown.

6. In the prevention of Enteric Fever such skilled inquiry from the Public Health Office is likely to produce the greatest amount of result at the minimum of expense.

This applies to other diseases besides Enteric Fever.

7. Shellfish play a decided part in the continuance of Enteric Fever and other Diarrhœal diseases in the City.

8. Additional powers are needed, so that information may be obtained as to the sources of infected shellfish, and so that pressure may be applied towards the purification of the supply. Mussels not properly cooked should not be used as an article of food or luxury.

9. It is probable that flies play a part in the spread of Enteric Fever in August and September.

This applies also to other diseases, and every possible means should, therefore, be adopted for the destruction of the house-fly and of its eggs, and for preventing its multiplication.

10. There is reason to think that work on polluted soil, in the warm, dry season, aids the spread of the disease. Disinfection of the soil should, then, be carefully carried out.

11. Watercress is indicated as a factor, though a small one, in the continuance of Enteric Fever. The subject requires further investigation.

12. I am confident that these inquiries, utilised as they are, will materially aid in the reduction of the disease. But the staff of skilled inquirers in the Public Health Office is too small. Such results are not to be obtained by the ordinary routine methods of the Sanitary Inspector, useful as these may be.

Owing to the favourable attitude of the wholesale vendors of mussels, we may now hope, in those cases in which the attack has been traced to mussels sold by such a dealer, to obtain accurate information about the laying from which the mussels have come. Owing to the pressure of other work, and the insufficiency of the staff engaged in the work of inquiry under Tuberculosis, Enteric Fever, and Diphtheria, it has not been found possible to continue these special inquiries in 1907.

In February, 1907, I addressed letters to the wholesale dealers, asking them to obtain from their books the layings from which mussels were derived and supplied on particular dates to certain retail dealers, whose names and addresses I furnished to them. The dates given were those on which cases of Enteric, who might be presumed to have contracted the disease from the consumption of mussels, had eaten mussels bought from the retail dealers on the list.

Before this I have had great difficulty in obtaining exact information. Five of the dealers, however, on this occasion were good enough to supply the information, which related to 23 cases. In one case the dealer could not give any information. In 15 instances the mussels came from a particular laying on the West Coast, and in 6 from a particular place in Ireland.

The cases occurred in various parts of the City.

It would be difficult to supply more conclusive evidence either as to the faulty character of particular layings or as to the need for systematic investigation and decided action.

In last year's report two main sources of cases of Enteric Fever were indicated, viz., the consumption of contaminated shellfish and the spread of the disease, often in an obscure form, from person to person, especially amongst children. From the inquiries made in 1906, taken along with those recorded in the Annual Report for 1905, it would appear that the main source of Enteric Fever in this City is shellfish.

It is true, more cases are traced to direct infection than to shellfish, but the latter are primary scattered isolated foci of infection; the former occur in nests, and the disease then tends to die out.

The chief facts relating to the source of Enteric cases in 1906 are given in the following tables:—

ENTERIC FEVER, 1906.

Cases notified in the First Quarter.

Cases infected in Manchester	Ages			Total	Per cent.
	Males 15 years and upwards	Females 15 years and upwards	Males and Females 0–14 years		
Traced to previous attacks....	10	8	20	38	42·2
Probably due to shellfish	24	10	3	37	41·1
Not traced	8*	5†	2	15	16·7
Total	42	23	25	90	100
Cases infected outside Manchester	4	0	1	5	—

* Of these, 1 was contracted in the Royal Infirmary.

† Of these, 1 was contracted in Crumpsall Infirmary, and 1 may have been infected in the course of work (rag picking).

In addition to the 95 cases given above, three cases were doubtful, and three were not Enteric Fever, making a total of 101 cases.

Attention is called to the very different age and sex distribution of those traced to previous cases and to shellfish respectively.

CASES NOTIFIED IN THE SECOND QUARTER.

Cases infected in Manchester	Ages			Total	Per cent.
	Males 15 years and upwards	Females 15 years and upwards	Males and Females 0–14 years		
Traced to previous attacks....	1	2	4	7	24·1
Probably due to shellfish	8	4	3	15	51·7
Not traced	3	2*	2	7	24·1
TOTAL	12	8	9	29	100
Cases infected outside Manchester	1	—	—	1	—

* Of these, 1 was a visitor to crippled children, many of whom are very dirty; as was, also, a case in the third quarter. Probably these were each infected from some overlooked attack in a child.

Besides the 30 cases classified, nine cases were probably or certainly not Enteric Fever. Total, 39.

CASES NOTIFIED IN THE THIRD QUARTER.

Cases infected in Manchester	Ages			Total	Per cent.
	Males 15 years and upwards	Females 15 years and upwards	Males and Females 0–14 years		
Traced to previous attacks....	5	5	7	17	24·6
Probably due to shellfish	15*	—	2	17	24·6
Not traced	13	14	8	35	50·8
TOTAL	33	19	17	69	100
Cases infected outside Manchester	3	4	1	8	—

* 1 due to mussels alone, 1 to oysters, and 1 to mussels or oysters.

In addition to the above, three cases were not Enteric Fever and five probably not so. Total, 85.

In this quarter a number of primary cases occur in infected districts in houses infested by prodigious numbers of flies.

CASES NOTIFIED IN THE FOURTH QUARTER.

Cases infected in Manchester	Ages			Total	Per cent.
	Males 15 years and upwards	Females 15 years and upwards	Males and Females 0-14 years		
Traced to previous attacks....	11	16	37	64	41·0
Probably due to shellfish	26	9	2	37	23·7
Not traced	21	18	16	55	35·3
TOTAL	58	43	55	156	100
Cases infected outside Manchester	2	—	—	2	—

One case was not Enteric Fever, and three were probably not so. Total, 162.

In the early part of this quarter flies are in evidence in connection with a number of untraced cases.

TOTAL CASES OF ENTERIC FEVER IN 1906.

Cases infected in Manchester	Ages			Total	Per cent.
	Males 15 years and upwards	Females 15 years and upwards	Males and Females 0-14 years		
Traced to previous attacks....	27	31	68	126	36·8
Probably due to shellfish	73	23	10	106	31·0
Not traced	45	37	28	110	32·2
TOTAL	145	91	106	342	—
Cases infected outside Manchester	10	4	2	16	—

In addition to the 358 cases here classified, 10 were not Enteric Fever and 17 were probably not. Total, 385.

It will be seen that no fewer than 83·3 per cent. of the cases notified in the first quarter were traced to a probable source of infection—42·2 per cent. to previous cases and 41·1 per cent. to shellfish, which practically means mussels.

In the second quarter 75·8 per cent. are traced—24·1 per cent. to direct infection and 51·7 per cent. to mussels.

In the third quarter 50·8 per cent. are traced—25·4 per cent. to direct infection and 25·4 per cent. to shellfish.

In the fourth quarter 64·7 per cent. are traced—41 per cent. to direct infection and 23·7 per cent. to mussels.

We are now in a position to say what is the most common period for the appearance of symptoms after the consumption of the infecting mussels. A special analysis of the facts on this point will be given in a subsequent report. Meanwhile, it may be said that 14 days appears to be the most common period.

As in the previous report, attention should be directed to the very different age and sex distribution of cases attributed to direct infection and to the consumption of mussels respectively.

The majority of cases traced to direct infection are children under the age of 15, and the sex and age distribution of these cases, small as are the numbers, is remarkably alike in each of the four quarters of the year.

Of those ascribed to the consumption of shellfish, the great majority are males over 15 years of age. This is due to the great consumption of mussels by males, especially by those at work, and more particularly by heavy drinkers. Amongst the untraced cases are a number who drink heavily, some of whom do not know whether they consumed shellfish or not at a period which would account for their illness. We therefore look with some interest to the age and sex distribution of untraced cases. This distribution resembles more that of cases traced to the consumption of mussels than that of cases traced to direct infection, not so much so, however, as to suggest that untraced cases are mainly due to consumption of shellfish.

Of the cases of Enteric Fever just discussed, a number were discovered by the Inspectors, or afterwards in the course of subsequent inquiries by Inspector Hewitt.

These are exhibited in the accompanying figures, which show that we may add to the cases already discussed 63 others, of whom, however, 59 gave a negative reaction.

Enteric Cases discovered by Inspector Hewitt.

	– Negative reaction	+ Reaction	Notified by Doctor after taking specimen of blood serum
First Quarter	10	16	16
Second Quarter	3	2	3
Third Quarter.....	3	0	0
Fourth Quarter	16	14	13
Total	32	32	32

Enteric Cases discovered by the Medical Officer of Health and Inspectors.

	– Negative reaction	+ Reaction	Notified by Doctor after taking specimen of blood serum
First Quarter	4	2	2
Second Quarter	2	2	2
Third Quarter.....	7	2	2
Fourth Quarter	14	16	12
Total	27	22	18

The cases of Enteric Fever traced to previous attacks, if carefully put together, would form themselves into groups, or nests, of connected cases, as they are shown to do in the Annual Report for 1905. Nine such nests are shown in the following figures. These have not, however, been carefully worked out, and Nest 4 in particular refers partly to locality, and not to a continuous history of infection. In the others, however, the cases are all, or nearly all, clearly linked together.

Nests of Enteric Cases, 1906.

Nest	District	Progressive Number of Cases	First Case
No. 1	Malpas Street, West Gorton	1, 2, 3, 15	See Sheet 320/05, or Annual Report, page 80.
No. 2	Bradshaw Street, Riga Street, and Owen Street, Hulme	5, 16, 17, 14, 97, 100	For full report see sheet attached to No. 16.
No. 3	Sunderland Street and Westmoreland Street, Harpurhey	28, 46, 281, 9 (also refer to 331/05)	Case 9 shows sketch 331/05, page 99 of Annual Report for 1905.
No. 4	Moston Lane and adjoining streets	167, 164, 188a, 302, 278, 219, 222, 236, 233, 237, 238, 321, 294, 181, 204, 240, 249, 264, 250, 251, 259, 264, 386, 326, 319, 324, 325, 340, 351, 352, 353, 361, 368, 38, 309	Notified from 167 ——— Many cases occurred in third quarter in 1904
No. 5	Clarke's, Cooke's, etc., Wellington Street, and Bradford	43, 65, 66, 67, 69, 70, 71, 73, 40, 122	Consult Case 43 for origin
No. 6	Clara Street, Newton	186, 39, 225, 254, 257, 202, 203, 218, 312, 336, 346, 354, 355, 358, 376	Consult Case 257 for origin
No. 7	Pickstone Street and Boardman Street, St. George's	188, 262, 295, 347, 373, 391	See Case 188
No. 8	Woodward Street and Sutton Street, Ancoats	234, 275, 276, 398; also 5 and 2, 1907	See Case 275
No. 9	Park Street, W. Gorton	252, 263, 273, 274, 285	See Case 252

1906.—Cases of Enteric Fever occurring in the different Districts of the City and at different Seasons of the Year.

Districts		Notified 1906 Onset of Fever, 1905	January 6	13	20	27	February 3	10	17	24	March 3	10	17	24	31	April 7	14	21	28	May 5	12	19	26	June 2	9	16	23	30	July 7	14	21	28	August 4	11	18	25	September 1	8	15	22	29	October 6	13	20	27	November 3	10	17	24	December 1	8	15	22	29
Ancoats	+	*	**	*****	...	**	*	...	...	...	...	*	...	...	...	*	...	...	...	...	...	...	*	*	...	...	*	...	**	...	...	...	...	...	...	...	...	...	...	*	**	...	*	***	**	*	*	**	*	...	...	...	*	...
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Central	+	..	...	...	...	*	...	*	...	*	*	*	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	*	...	...	...
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St. George's	+	*	**	...	****	*	*	...	...	...	...	*	**	...	...	...	*	...	...	...	...	*	...	...	*	*	*	...	*	...	...	*	...	...	...	...	*	...	...	**	*	**	**	*	***	**	*	*	...	...	***	...	...	...
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Cheetham	+	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	*	...	...	...	*	...	...	...	*	...	...	*	...	*	...	...	...	...	...	...	...	...	...	...	...	...
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Crumpsall	+	..	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	*	*	...	...	...	*	...	...	...	...	*	...	***	*	...	...	...	*	*	...	...	*	...	*	...	...	...	...	...	...	...	...	...	...	...
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Blackley	+	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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Harpurhey	+	**	*	...	**	...	...	...	...	*	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	*	...	...	...	...	*	...	...	*	...	***	***	**	...	****	**	**	****	...	...	...	*	...	...	...
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Moston	+	...	...	*	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	**	...	...	...	*	...	...	...	...	...	...	*	...	...	...
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Newton	+	*	*	**	*	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	*	...	...	...	...	**	...	*	...	*	**	***	*	*	*	*	*	...	...	**	**	**	...	...	...	...	...
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Bradford	+	******	...	...	****	*	...	...	...	...	*	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	*	...	...	**	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...
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Beswick	+	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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Clayton	+	*	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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Ardwick	+	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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Openshaw	+	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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West Gorton	+	*****	*	**	*	...	*	...	*	...	...	...	*	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	*	**	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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Rusholme	+	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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Chorlton-upon-Medlock	+	...	...	*	...	...	...	*	...	...	...	...	...	...	*	...	...	...	*	*	...	*	...	...	*	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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Hulme	+	*****	...	*	**	****	*	...	...	...	...	...	...	...	...	...	...	...	**	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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Moss Side	+	*	...	...	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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+ Are cases giving a Widal reaction. — o Cases giving a negative reaction or in which no test has been made.

The subject will be considered hereafter.

The course of the disease in Manchester in 1906 is shown on the accompanying spot chart, prepared by Mr. Roos. (See Chart.)

We see that Ancoats is invaded in September and October. St. George's suffers in January, but after the beginning of the year the disease attains no great intensity in this district. Harpurhey suffers heavily in September, October, and November; and Blackley, which adjoins Harpurhey, about the same period. Bradford has a heavy incidence in January. Ardwick suffers in September and October. West Gorton is severely affected in September and October. Chorlton-on-Medlock is invaded in October and November. Hulme, also, is invaded in the same months, as well as early in the year.

The distribution waxes and wanes with the shellfish season.

I append the usual tables for Enteric Fever.

Table 1 shows the notified cases distributed in quarters of the year.

From the facts now accumulated it should be possible to throw light on this distribution, the main factors being shellfish, direct infection, and dissemination by flies; but the discussion of this question must be deferred for the present.

The distribution of Enteric Fever in weeks is shown in Table 2. The cases are concentrated in two periods—January and September to December

Attention has been called in previous reports to the definite rise of Enteric Fever in a particular week, which is, in 1906, the week ending September 13th. On this, also, some light may now be obtained.

Table 3 shows the attack rate per 1000 living in different divisions of the City. The distribution does not differ widely from that of the previous five years.

From Table 4 we see that the districts which have suffered most severely in 1906 are the adjoining districts of Crumpsall, Blackley and Harpurhey, Bradford, and West Gorton.

Table 5 shows the number of attacks distributed in ages for 10 years, and the case fatality per cent.

The high case fatality at ages above 15 probably stands in relation with the habits of persons attacked. At ages 0–5 it is probably delusive, many cases escaping attention.

Table 6 shows that the death-rate from Enteric Fever in 1906 slightly exceeded the mean for the previous five years, while the death-rate for England and Wales was below the mean.

In conclusion, I would urge that the investigation work which we have been pursuing is most necessary to enable us to arrive at a clear idea of the causes of Enteric Fever, and to establish the means by which it may be reduced. For the effectual continuance of such work, more special assistance is required.

1.—Enteric Fever Attacks Reported in Quarters.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1891	173	119	180	289
1892	164	106	156	184
1893	108	80	220	210
1894	118	75	135	132
1895	110	90	100	193
1896	118	130	108	157
1897	97	57	137	212
1898	143	79	134	286
1899	101	66	104	110
1900	85	78	103	112
1901	43	43	149	124
1902	63	82	111	122
1903	90	82	87	128
1904	69	68	105	83
1905	111	62	71	101
1906	81	41	110	152

2.—Enteric Fever Attacks in weeks reported in 1906, according to date of onset.

First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Jan. 6	7	Apl. 7	3	July 7	9	Oct. 6	13
,, 13	14	,, 14	1	,, 14	4	,, 13	22
,, 20	15	,, 21	3	,, 21	5	,, 20	16
,, 27	14	,, 28	8	,, 28	3	,, 27	23
Feb. 3	7	May 5	3	Aug. 4	7	Nov. 3	16
,, 10	4	,, 12	0	,, 11	2	,, 10	7
,, 17	2	,, 19	3	,, 18	6	,, 17	14
,, 24	6	,, 26	3	,, 25	4	,, 24	9
Mch. 3	2	June 2	3	Sept. 1	4	Dec. 1	8
,, 10	3	,, 9	2	,, 8	13	,, 8	8
,, 17	4	,, 16	4	,, 15	20	,, 15	2
,, 24	2	,, 23	5	,, 22	19	,, 22	6
,, 31	1	,, 30	3	,, 29	14	,, 29	8
Total...	81	Total...	41	Total...	110	Total...	152

City Total 384

3.—Enteric Fever Attacks, 1906.—Rates per 1000 living, compared with mean of five years.

	1901	1902	1903	1904	1905	Mean	1906
Twelve Notification Towns ...	1·26	1·01	0·81	0·71	0·61	**0·88**	0·34
City of Manchester	0·66	0·69	0·70	0·58	0·59	**0·64**	0·65
Manchester Township	0·65	0·80	0·77	0·82	0·66	**0·74**	0·73
North Manchester.....	0·77	0·85	0·59	0·56	0·58	**0·67**	0·77
South Manchester.....	0 58	0·52	0·73	0·47	0·55	**0·57**	0·53

4.—Enteric Fever, 1906.—Number of Attacks in Districts, with Attack Rate, Case Fatality per cent., and Removals to Hospital per cent.

Districts	Attacks	Attack Rate per 1,000 living	† Case Fatality per cent.	Removals to Hospital per cent.
Ancoats	37	0·85	29·7	73·0
Central	12	0·45	8·3	91·6
St. George's	44	0·76	25·0	81·8
Cheetham	15	0·37	6·7	73·3
Crumpsall	11	1·18	9·1	54·6
Blackley	8	0·84	25·0	50·0
Harpurhey	33	1·57	9·1	54·5
Moston	8	0·45	12·5	87·5
Newton Heath	29	0·75	13·8	58·6
Bradford	24	0·96	29·2	54·2
Beswick	7	0·57	...	85·7
Clayton	9	0·72	22·2	44·4
Ardwick	17	0·38	29·4	76·5
Openshaw	14	0·49	50·1	92·9
Gorton (West)	40	1·27	17·5	55·0
Rusholme and Kirkman.	5	0·19	...	60·0
Chorlton-upon-Medlock	28	0·50	21·4	67·9
Hulme	36	0·56	30·6	58·3
Moss Side	7	0·25	28·6	85·7
City of Manchester	**384**	**0·65**	**21·4**	**66·9**

† Corrected; the fatal cases are those actually occurring amongst the cases notified.

5.—Enteric Fever.—Number of Attacks, of Deaths, and Case Fatality per cent. at Different Ages, for the Ten Years 1896–1905, and for 1906.

Ages	1896-1905			1906		
	Attacks	Deaths	Case Fatality per cent.	Attacks	Deaths	Case Fatality per cent.
Under one year ...	8	2	25·0	...	...	...
1 to 2 years ...	31	6	19·4	1	...	...
2 to 3 „ ...	57	6	10·5	3	...	...
3 to 4 „ ...	81	10	12·4	9	...	...
4 to 5 „ ...	103	10	9·7	8	1	12·5
5 to 6 „ ...	122	14	11·5	9	...	...
6 to 7 „ ...	116	11	9·5	14	1	7·1
7 to 8 „ ...	114	9	7·9	6	...	...
8 to 9 „ ...	137	13	9·5	7	1	14·3
9 to 10 „ ...	114	10	8·8	7	1	14·3
10 to 15 „ ...	713	81	11·4	53	7	13·2
15 to 20 „ ...	827	160	19·4	44	3	6·8
20 to 25 „ ...	842	176	20·9	56	13	23·2
25 to 35 „ ...	1099	244	22·2	95	29	30·5
35 to 45 „ ...	498	140	28·1	41	14	34·1
45 to 55 „ ...	217	67	30·9	23	9	39·2
55 to 65 „ ...	65	29	44.6	8	3	37·5
Over 65 „ ...	20	10	50·0	...	...	...
All ages	5164	998	19·3	384	82	21·4

6.—Enteric Fever Mortality, 1906. Rate per 1000 living, compared with mean of five years.

	1901	1902	1903	1904	1905	Mean	1906
England and Wales	0·16	0·13	0·10	0·09	0·09	**0·11**	0·09
London	0·12	0·13	0·09	0·06	0 05	**0·09**	0·06
Dublin	0·32	0·33	0·24	0·19	0·16	**0·25**	0·16
City of Manchester	0·14	0·12	0·17	0·12	0·09†	**0·13†**	0·14†
Manchester Township	0·16	0·12	0·16	0·15	0·12	**0·14**	0·16
North Manchester.....	0·13	0·11	0·15	0·11	0·07	**0·11**	0·11
South Manchester.....	0·13	0·12	0·18	0·11	0·09†	**0·13†**	0·16†

† Exclusive of Moss Side and Withington.

MEASLES.

Measles is an eruptive fever, the eruption of which affects the face, trunk, and limbs. It usually begins with signs similar to those ushering in a severe cold, including injection of and running at the eyes, sneezing, a soft husky cough, and rise of temperature. When these signs have lasted three days, the characteristic rash makes its appearance.

Period of the disease at which death occurs, and its sequelæ.

A large proportion of the deaths occurs within a fortnight from the appearance of the eruption, from which it may be inferred that in these cases death has been due to the virulence of the infection.

Croup is apt to occur, and Broncho-pneumonia is of frequent occurrence, in the course of an attack. Suppuration of the middle ear not infrequently ensues. But the most serious feature of Measles is the liability which it leaves to an attack of Tuberculosis of the lung.

At the same time, it is in its earlier stages attended with a high fatality.

Measure of the fatality of the disease in Manchester.

A comparison of the mortality due to Measles with that caused by other zymotic diseases, and by Phthisis, is given in Table 5 appended to this section (page 79), which shows how greatly the mortality from Measles exceeds that from Scarlet Fever, Diphtheria, or Enteric Fever. In 1897 and 1899 the number of deaths from Measles exceeded the number due to all these fevers, with Whooping Cough added.

Measles is most fatal in the second quarter of the year, as shown by these figures:—Deaths from Measles in quarters 1896–1905, City of Manchester—938, 1416, 864, 745.

The mortality from Measles in England and Wales has not altered within the last fifty years. If we review the mortality in Manchester for five yearly periods since 1870, we find that the mortality was highest in the five years 1896-1900.*

Most fatal in the second year of life.

It is in the second year of life that the disease exacts the heaviest death toll. This is well seen in the figures for any year, and is shown in the following :—

DEATHS FROM MEASLES IN THE CITY OF MANCHESTER.

	Under One Year			Years of Age				Total 5 Years and upwards
Years	Under 3 Months	3-5 Months	6-11 Months	1	2	3	4	
1895 } 1899 }	14	43	521	1091	493	257	125	136

It would appear from these figures that infants very largely escape. The number of deaths out of every 100 attacked is largest at the very commencement of life, and gradually diminishes with advancing age.

This fact emphasises the degree to which infants are protected from infection.

It is probable that the relative immunity during the first six months of life is largely due to insusceptibility, but is also due in part to a lesser exposure to infection.

It is important to note the age at which measles is most fatal, as we thereby realise the importance of protecting children at the earlier ages from infection, if that be possible. The high mortality at the earlier ages may be, and probably is, due largely to the disease beginning in and being imported by older children, who may themselves have received a diluted infection at school, or out of doors, resulting in a comparatively mild attack, while in the confined atmosphere of the home there is accumulated a much more concentrated virus.

Age at which the largest number of cases occur.

The severity of the disease rapidly diminishes as the child grows older. Hence, the number of deaths at any age is no index of the number of cases at that age, From Dr. Theodore Thomson's report to the Local Government Board, it would appear that cases are proportionately most numerous at the ages 2, 3, and 4. The question arises whether, if we could by any administrative measures

* Annual Report, 1903, page 143.

diminish the incidence of Measles on the infant classes in schools, we should thereby increase the proportion attacked in the higher classes. Does susceptibility diminish merely as the result of advancing age ?

The probability is that, unless the measures taken were very thorough, more pupils in the higher classes would be susceptible, and these classes would be more severely invaded.

Mode of diffusion of the disease.

Measles once established in the infant department of a school passes rapidly through it, until the available material has been used up, or so many have been infected that the disease is unable to extend. It is probable that infection is derived largely from the cloud of spray scattered by children already attacked in the act of coughing, and by mucus from the nostrils and mouth. Possibly, also, infective particles are derived from the skin.

The question arises how far articles used by the infected child, as well as the furniture and floor of the school, become infectious. It can scarce be supposed that the schoolroom itself is non-infectious for some time after the occurrence of one or more cases.

The rapidity with which the disease passes through a school is shown by the lists of cases notified by the Education Department from schools recently invaded.

The rapidity with which Measles passes through its phases may be seen by comparing for the City the number of deaths in quarters of the year in successive years :—

Year	1st Quarter	2nd	3rd	4th
1902	67	68	60	47
1903	158	104	54	29
1904	100	189	83	53
1905	41	99	77	13
1906	60	266	118	32

Thus, in 1903 and 1904 the epidemic wave has spent itself within the year. This is not always the case, as may be seen from the figures for 1902. The figures for the whole City are, in fact, composite, and are made up of those relating to its component parts.

For the last ten years the mortality is shown year by year for the whole City, its main divisions, and the individual sanitary districts, in the following table:—

DEATHS FROM MEASLES IN DISTRICTS.

	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	Average death-rates eight years 1891-98	Average birth-rates, same years
City of Manchester	567	628	271	699	254	292	242	345	280	231	5·82	32·97
Manchester Township	281	246	70	339	50	78	59	127	92	83	8·12	34·91
North Manchester	143	89	81	180	85	49	112	58	83	71	4·71	32·97
South Manchester	143	293	120	180	119	165	71	160	105	77	5·05	31·80
Ancoats	97	94	35	125	6	33	24	51	34	31	8·74	38·19
Central	30	76	17	52	9	12	15	30	18	19	7·37	29·52
St. George's	154	76	18	162	35	33	20	46	40	33	8·20	35·67
Cheetham	24	11	12	29	3	6	9	8	7	5	2·90	32·89
Crumpsall	1	2	0	11	1	1	1	2	10	1	2·99	23·24
Blackley	1	3	0	7	1	6	5	5	1	7	1·58	27·72
Harpurhey	15	7	5	15	6	4	15	3	8	8	4·82	35·08
Moston	1	4	1	9	5	4	4	5	5	11	2·14	30·66
Newton	29	37	6	51	16	14	30	20	29	9	5·34	31·68
Bradford	60	10	41	42	37	10	18	8	15	21	7·87	37·60
Beswick	8	7	15	13	10	2	17	5	5	5	6·76	38·25
Clayton	4	8	1	3	6	2	13	2	3	4	3·75	35·04
Ardwick	20	43	13	42	23	25	12	22	22	17	5·18	35·34
Openshaw	23	23	45	10	23	12	20	7	16	15	6·36	32·95
Gorton, West	37	49	11	37	8	22	4	19	12	8	6·33	36·50
Rusholme	14	13	3	10	2	7	5	21	12	3	2·95	24·29
Chorlton-on-Medlock	11	55	13	37	11	41	13	33	18	14	3·51	26·77
Hulme	38	110	35	44	52	58	17	58	25	13	5·88	34·05

In the above table are also given the average death-rates from Measles from 1896 to 1905 in each district. From these tables we learn that the average death-rates differ in different sanitary districts. Allowing for the difference in the birth-rates, they are highest in the three Central districts—in Bradford, Newton and Beswick, West Gorton and Openshaw. This order agrees with that pertaining to the Diarrhœa mortality, and shows that insanitary conditions, ignorance, and neglect have much to do with the mortality.

In the Manchester Township and in North Manchester there is shown a tendency to a four-yearly maximum, while in South Manchester the maximum comes every two years.

If we examine contiguous districts, we find that there is no close correspondence between their maxima, while in some instances there is a striking divergence, as, for example, in the cases of Crumpsall and Blackley, Bradford and Beswick, West Gorton and Beswick.

The course of the figures would seem to show that this divergence depends on local causes other than exhaustion of material. Instances have also been given in the annual reports and in a special report to the Sanitary Committee made in 1899, showing that some schools in a district may have undergone severe visitation while others have escaped.

No doubt this immunity is only temporary in its character. It is, however, of sufficient duration to show that the disease tends to be localised in particular groups and localities in which intercourse is more easy. This was particularly the case in one instance in which two Jewish schools in a district were severely affected, while two non-Jewish schools had escaped. The disease had spread, no doubt, outside the schools from one Jewish child to another, but had spared the non-Jewish children who were not in intimate relation with the Jewish children.

The same thing is manifest in the absence of relationship between the incidence of Measles on St. George's and Harpurhey, and its incidence on Blackley, which is reached by tram through the first two districts. The opportunities of spread in the trams are thus inadequate to cause extension from one district to another. It might be supposed that the failure of one school to become affected while a neighbouring school is suffering severely is due to exhaustion of material in the former. This, however, is not the case since the first school is subsequently invaded.

We may infer, therefore, that while Measles spreads rapidly when a number of susceptible individuals are brought together, especially in schools, and more slowly when a number of susceptible children are living in a district and are

gradually brought into relationship one with another, it tends to be localised for a time in particular school areas, and in districts delimited in some manner one from another.

If, therefore, any satisfactory method could be devised for limiting or arresting its spread in one area, it should be possible to take it in detail, and to check its main extension by a series of local efforts.

The Reasons which make Measles difficult to arrest.

Before considering the efforts which have been made to bring the disease under control, we may usefully enquire why so little has been effected. In the first place, the disease is highly infectious for several days before the appearance of the eruption, a period during which the parents and teachers are apt to be quite at fault as to the nature of the illness from which the child is suffering. By careful training, it is true, teachers might acquire some facility in detecting danger, but much practice would be needed, and many mistakes would be made.

Another difficulty is that parents regard the disease too lightly. As there is little interference, and that not of a compulsory or troublesome character, they are often at no pains to isolate the sufferer from the rest of their children, to exclude other children, or even to keep the ailing child indoors. Often they cannot effectually protect the rest of their children, from lack of accommodation.

In a large proportion of instances medical advice is not obtained—according to Dr. Wheatley's observations in Blackburn, in one-half. All degrees of neglect occur.

These are the chief causes of the rapid spread of the disease, namely, the high infectivity of the child in the early and unrecognised stages of the disease, the carelessness of parents, and the lack of means of isolation.

Action taken by Sanitary Authorities.

At various times Sanitary Authorities have, with the consent of the Local Government Board, included Measles amongst diseases compulsorily notifiable. In a report made to the Sanitary Committee in 1894, and published in the Annual Report of the Medical Officer of Health for that year, reasons were given why this course should not be adopted. The chief of these were the great expense of notification, and the failure of Sanitary Authorities, such as those of Edinburgh and Birkenhead, to control the spread of the disease after having secured compulsory notification. With regard to the expense involved in compulsory notification, if we assume that two per cent. of all children attacked

die, the deaths in 1904—numbering 425—would correspond to 21,250 cases. Had all of these been notified, the expense of notification in that year would have been £2,656.

Had half of them been notified, it would still have been £1,328.

In 1906 the expense would have been considerably greater.

It would be clearly useless to go to this expense unless the action taken upon it were effectual.

Effectual action involves visits to each case by the Sanitary Inspector and, at least in a few instances, diligent search for fresh cases in the district, and the enforcement of isolation.

To carry out these duties in a manner calculated to affect the course of an outbreak, or to diminish the mortality, means an expenditure of skill and time quite out of the power of the district sanitary inspectors to give. Largely, no doubt, for this reason a number of Sanitary Authorities have abandoned compulsory notification of the disease.

Yet it cannot be doubted that information as to the whereabouts of cases is a necessary preliminary to effectual control.

In other instances, intimation of all cases occurring in elementary schools has been furnished to the Sanitary Department by the Education Authority, and visits have been paid to the homes of children attacked by sanitary inspectors, who have given instructions as to isolation, care of cases, etc., children not attacked being excluded from attendance at school for a period of three weeks or more. No doubt, in this way, the number of cases occurring in schools has been limited to some extent, but on the whole this procedure has failed to check the course of an outbreak or to control the propagation of the disease in the school.

From 1895 to 1900, during which period Measles assumed very formidable dimensions in Manchester, as in other Lancashire towns, the infant departments of schools were closed for a period of three weeks, when the number of children attacked reached 10 per cent. of the average attendance in the department. When 10 per cent. of the children in an infant department have been attacked, it is probable that a much higher percentage are protected, as many of the children will have suffered prior to school age.

Your Medical Officer of Health showed that, with few exceptions, this procedure arrested the spread of the disease in the school affected, and it was inferred that as a consequence the spread of the disease was diminished in the district served by the school.

As a rule, also, it was found that the attendance, when school was resumed, had not suffered, but the reverse.

This procedure gave an opportunity to cleanse the school. It was considered also that parents were entitled to this protection.

Care was taken to prevent the children when absent from the particular school from attending Sunday schools or other day schools.

It cannot be supposed that the interests of education suffered seriously by the closure of infant departments, and your Medical Officer of Health still considers that this action was beneficial.

In the year 1900 the Sanitary Committee, at the instance of the School Board, determined that this action should be discontinued.

He does not advise, however, that it should be resumed without the co-operation of the Education Committee as any successful action in connection with schools must necessarily be based on their assistance.

The course pursued since the year 1900 has been as follows:—

Daily lists are furnished by Mr. Wyatt of the names and addresses of cases of Measles which have come to the knowledge of the school attendance officers.

The sanitary inspector visits and gives advice, filling up a short form, and leaving a notice of the dates on which the children attacked and not attacked may return to school.

Instructions are given as to disinfection, according to the directions in the following handbill:—

Precautions against Measles.

1. Measles is a very fatal disease. In the years 1896, 1897, 1898, 1899, 1900, 1901, and 1902, the total number of deaths from Measles in Manchester was nearly four times more than the number from Scarlet Fever.

2. It is very highly infectious, especially in the early stage for several days before the rash appears. The early signs of the disease are coughing, sneezing, and redness of the eyes, with some degree of illness. When Measles has occurred in a school, coughing alone should be suspected.

3. A child at school with such marks of illness should be at once sent home, and the teachers, particularly in the Infant Department, should be on the outlook for the first signs of illness if Measles has made its appearance in the school or neighbourhood. The occurrence in a school of any catarrhal illness in a child, if Measles has made its appearance in the school, should be considered sufficient reason for sending the child home till the nature of the illness has become plain.

4. A child suffering from Measles should not be allowed to return to school until 4 weeks have passed after the appearance of the eruption.

5. Any one attacked by Measles should, if possible, be placed in a separate room upstairs with a good fire burning in the room, and the window open sufficiently to admit fresh air without allowing the room to get cold. The bed should be placed in that portion of the room, not lying between the window and the fire, in which there is least draught. In summer the fire should not be large, but should not be absent. Where a separate room cannot be provided the same procedure should be carried out.

6. In view of the high mortality from the disease, parents are advised in every instance to seek medical advice.

7. The children at home not attacked must not go to school or other place of meeting for 3 weeks after the appearance of the eruption in the first child, and, if subsequent cases occur, not until 3 weeks after the appearance of the eruption in the last child attacked.

8. Where a case of Measles has occurred in a house, a careful outlook should be kept on the other children, so that, on the first appearance of illness, they may be kept at home and properly treated.

9. When a child at any house is suffering from Measles, no neighbour's child or neighbour accompanied by a child must be admitted, nor should the child ill with Measles be allowed to play with other children for a month after the appearance of the rash.

10. *Disinfection.*—Before the child attacked returns to school the following measures should be carried out. All articles of clothing worn by the sick child, and the bedding and hangings of the sick room, should be washed and put out to air for some days. All washable articles of furniture in the room should be washed. The walls of the room, if papered, should be cleaned down with dough, the dough being at once burned. If not papered, the walls should be lime-washed. In all cases the ceiling should be lime-washed. The floor should be thoroughly scrubbed. The window

should be left open for several days, and the window curtains removed so as to admit as much light as possible. The skin of the child who has been ill should be thoroughly cleansed by several washings with soap and warm water.

MEDICAL OFFICER OF HEALTH.

Public Health Office,
Town Hall, Manchester,
January 19th, 1904.

Subsequent visits are paid to see that the measures prescribed have been carried out, and to attend to sanitary defects.

When it is mentioned that over 4,000 cases were notified from the Education Authority in the second quarter of 1906, it will be understood that the work must often be very perfunctorily carried out.

Delays will also occur.

Moreover, the sanitary inspector has no power to insist on effective measures of isolation being carried out.

It is important to understand how much is involved in these notifications and visits.

Up to the end of 1906, 6,497 new cases were intimated by Mr. Wyatt to the Medical Officer of Health.

In considering how we may make a beginning, we have to represent to ourselves what it is that we aim to do.

First of all, we want parents and teachers to look out for and recognise Measles from the commencement of its onset.

We require by some means to obtain early information as to the occurrence of all cases.

We need to be able to secure isolation, by which is meant the seclusion of affected children, and the exclusion of other persons from infected homes.

A sanitary staff exclusively devoted, for the time being, and as occasion requires, to the service of this disease, and specially trained for the purpose, would be needed. This is the most important of all. Such a staff would advise parents and enforce requisite measures.

1. How are we to become acquainted with the addresses of cases ?

It is suggested that we should apply for power to make Measles compulsorily notifiable.

Reliance might be placed, in the first instance, on notifications obtained from the Education Authority. These would, at all events, show the districts in which the disease was prevalent.

By means of inquiries in the affected districts, many other cases would be discovered.

2. The staff required would number not less than six, and female sanitary inspectors should form part of the staff.

When not engaged in dealing with Measles, the special staff would be occupied with Tuberculosis, Whooping Cough, Diarrhœa, instruction in infant feeding, and any special inquiry which might be needed.

These duties are at present very imperfectly carried out, and a staff of skilled inspectors attached to the Public Health Office would do most valuable work. The money expended on this staff would be profitably expended, even if Measles were not brought under control.

An outbreak in any school would lead to the concentration of effort on the district served by that school.

3. Legal powers are required, which will bring home to parents the necessity of treating Measles as a serious disease, and of carrying out due measures of precaution.

For this purpose some such power as the following would be necessary :—

> Any person who, being in charge of a person suffering from Measles, exposes such person without proper precautions against spreading the disease in any street, public place, shop, or inn, or who fails, as far as practicable, to secure isolation of any person so suffering, shall be liable to a fine not exceeding one pound.

The following would also be useful :—

> When any member of a household (invaded by Measles) is in attendance at an elementary school, intimation of the fact shall be forthwith sent by the head of the household to the Medical Officer of Health at the Town Hall, etc.

4. Education of teachers and parents in the early detection of cases is of the highest importance. Whenever Measles makes its appearance in a school, especially in the infant department, the teachers should devote considerable time to ascertaining if any children exhibit catarrhal symptoms, and any such should be sent home.

As already explained, the disease often spreads rapidly in schools, and is carried thence to younger members of families.

It should therefore be possible through the schools to affect the districts served by them.

It is hoped, moreover, that this statement will help to make clear how a special staff is required for the Public Health Department if as much is to be effected in connection with Measles and Whooping Cough as in regard to other matters here mentioned.

It is not certain that we can do much more than mitigate the mortality from Measles and Whooping Cough by seeing that the children are placed under the best possible conditions at home.

It is, however, possible that if the districts connected with outbreaks in schools were promptly dealt with, the extension of the disease might be checked, except in so far as communication between children at play is concerned.

It is probable that the type of disease would thus be rendered milder.

One cannot speak very confidently as to what would be effected, and the case for a special staff would, therefore, not rest so much on work to be done in connection with Measles and Whooping Cough as on the work required to be done in connection with infant feeding, Diarrhœa, the management of infants, inculcation of cleanliness, the protection of foods, etc.

Yet, on the other hand, our chief hope as regards the reduction of the great mortality from Measles lies in the prospect that by steady and persistent instruction we may gradually bring about a different way of looking at and dealing with this disease.

Appended are the usual tables given in connection with Measles

Table 1 shows that 49 infant departments were severely visited in 1906 by Measles or Whooping Cough—a very high proportion.

Table 2 shows that Manchester had a higher death-rate in 1906 from Measles than in any recent year. Indeed, we have to go back to the year 1899 before we come upon a death-rate more severe.

Table 3 gives the death-rates from Measles for the whole City, for each of its main divisions, and for each of the sanitary districts.

The death-rate is highest in the Manchester Township, and next highest in South Manchester. It is deserving of notice that, given an equal number of cases, the death-rate from infectious diseases is always highest in the poorest parts of the City. Owing, however, to the unequal distribution of the disease from year to year, the relation just mentioned is not a constant one

The districts most severely affected, so far as mortality is concerned, in 1906 were: the Manchester Township, the Central, St. George's, Newton Heath, Bradford, Beswick, Clayton, Ardwick, Openshaw, and Hulme.

If we compare this list with that given in the report of 1898 for the eight years 1891–1898, we find that precisely the same districts take the highest positions, with little alteration in their relative positions—only West Gorton has dropped out in 1906.

Table 4 shows more plainly the formidable mortality from Measles occurring amongst young children under five years of age, especially in the years 1895, 1896, 1897, 1899, 1904, and 1906.

Table 5 permits of a comparison in the mortalities from Measles, other zymotic diseases, and Phthisis. It will be seen that Measles makes a good third to Phthisis and Diarrhœa in the high death-rate which is directly to be ascribed to it.

The number of schools having over 10 per cent. of the average attendance in the infant department affected with Measles or Whooping Cough at some period of the year, distributed in districts, was as follows:—

TABLE 1.

	Total	PERCENTAGE ABSENT AT ONE TIME				
		10–	20–	30–	40–	50–
Ancoats	5	4	1	...	...	...
Central	2	1	1	...	...	...
St. George's	3	3	...	...	...	...
Cheetham	3	2	...	1	...	...
Crumpsall	3	2	1	...	...	...
Blackley	2	...	1	...	...	1
Harpurhey	...	...	...	...	...	...
Moston	2	...	2	...	...	...
Newton	6	2	3	1	...	...
Bradford	2	2	...	...	...	...
Beswick	2	2	...	...	...	...
Clayton	...	...	...	...	...	...
Ardwick	4	3	1	...	...	...
Openshaw	3	3	...	...	...	...
West Gorton	3	2	1	...	...	...
Rusholme	1	1	...	...	...	...
Chorlton-upon-Medlock	3	2	1	...	...	...
Hulme	4	3	...	...	...	...
Moss Side	1	1	...	...	...	...
Total	49	33	13	2	...	1

The following are the rates of mortality for 1906, compared with the mean of the previous five years:—

TABLE 2.—1906.—MEASLES MORTALITY.—RATE PER 1000 LIVING, COMPARED WITH MEAN OF FIVE YEARS.

	1901	1902	1903	1904	1905	Mean	1906
England and Wales	0·27	0·38	0·27	0·36	0·32	**0·32**	0·27
*76 Great Towns	0·43	0·49	0·36	0·47	0·39	**0·43**	0·40
London	0·43	0·51	0·45	0·49	0·37	**0·45**	0·41
City of Manchester...	0·53	0·44	0·62	0·76	0·40†	**0·55**	0·83†
Manchester Township ...	0·58	0·44	0·96	0·86	0·64	**0·70**	1·18
North Manchester	0·29	0·67	0·34	0·50	0·39	**0·44**	0·56
South Manchester	0·68	0·29	0·64	0·89	0·28†	**0·56**	0·85†
*142 Smaller Towns	0·25	0·37	0·29	0·36	0·31	**0·32**	0·22
Rural Districts	0·17	0·27	0·17	0·23	0·24	**0·22**	0·14

* The rates for 1901 are for the 33 Great Towns and 67 Smaller Towns, and for 1902 and 1903 103 Smaller Towns.

† Exclusive of Moss Side and Withington.

TABLE 3.—1906.—DEATHS AND DEATH-RATES FROM MEASLES IN THE VARIOUS DIVISIONS OF THE CITY.

Statistical Divisions		Estimated Population	Deaths	Death-rate
City of Manchester		637,520	475	0·75
I. Manchester Township ...		128,040	151	1·18
II. North Manchester.....		187,201	105	0·56
III. South Manchester.....		322,279	219	0·68
I.	Ancoats	43,575	64	1·47
	Central	26,383	24	0·91
	St. George's	58,082	63	1·08
II.	Cheetham	41,004	5	0·12
	Crumpsall	9,301	6	0·65
	Blackley.....	9,573	2	0·21
	Harpurhey	20,989	6	0·29
	Moston	17,935	7	0·39
	Newton Heath	38,521	27	0·70
	Bradford	24,997	27	1·08
	Beswick	12,377	16	1·29
	Clayton	12,504	9	0·72
III.	Ardwick	44,261	42	0·95
	Openshaw	28,600	26	0·91
	Gorton (West)	31,529	21	0·67
	Rusholme and Kirk.....	26,355	10	0·38
	Chorlton-upon-Medlock..	56,361	35	0·62
	Hulme	64,062	79	1·23
	Moss Side	28,105	4	0·14
	Withington	43,006	2	0·05

The annual death-rates from Measles since 1891 at ages under 5 have been as follows :—

TABLE 4.

DEATH-RATES FROM MEASLES AND FROM ALL CAUSES UNDER 5 YEARS OF AGE.

	1891	1892	1893	1894	1895	1896	1897	1898
Measles ...	3·26	5·50	4·40	3·24	7·53	8·48	9·35	4·02
All causes ...	86·6	78·7	86·3	66·5	90·7	80·4	85·3	78·1
	1899	1900	1901	1902	1903	1904	1905	1906
Measles ...	10·31	3·66	4·29	3·51	5·13	6·24	3·10	6·31
All causes ...	87·5	78·3	74·5	64·7	69·5	75·8	59·2	66·6

TABLE 5.

A comparison of the mortality due to Measles with that caused by other zymotic diseases, and with Phthisis, is given in the following figures :—

No. of Deaths from.....	1891	1892	1893	1894	1895	1896	1897	1898
Measles.....	220	369	293	222	505	567	628	271
Scarlet Fever	114	130	140	116	173	198	124	65
Diphtheria	122	91	122	102	72	54	29	41
Enteric Fever	189	124	127	91	95	118	95	120
Smallpox	0	2	49	21	2	0	0	0
Whooping Cough	518	368	240	286	250	359	299	170
Diarrhœa, &c.	432	418	956	375	904	572	964	1090
Phthisis.....	1117	1053	1060	1026	1139	1078	1139	1056
No. of Deaths.....	1899	1900	1901	1902	1903	1904	1905	1906
Measles.....	699	254	292	242	345	425	231	475
Scarlet Fever	46	105	127	146	97	85	78	108
Diphtheria	71	76	133	123	136	99	127	119
Enteric Fever	73	75	75	66	93	66	55	83
Smallpox	0	0	0	0	24	9	0	0
Whooping Cough	227	371	224	242	213	280	195	193
Diarrhœo, &c.....	1121	822	1019	296	507	761	729	981
Phthisis.....	1117	1135	1144	1145	1025	1106	988	1089

We thus see how greatly the mortality from Measles exceeds that from Scarlet Fever, Diphtheria, or Enteric Fever.

In 1897 and 1899 the deaths from Measles exceeded in number those from all these fevers, with Whooping Cough added.

WHOOPING COUGH

Whooping Cough comes next to Measles in the high mortality which it causes among young children. Like Measles, it leaves many of those who recover very prone to contract Tuberculosis. The death-rate in 1906 is lower than the average for recent years, but higher than that holding for England and Wales, for London, or for other great towns. The facts are given in the following table :—

1906.—Whooping Cough Mortality.—Rate per 1000 living, compared with mean of five years.

	1901	1902	1903	1904	1905	Mean	1906
England and Wales	0·30	0·29	0·27	0·34	0·25	**0·29**	0·23
*76 Great Towns	0·36	0·37	0·33	0·40	0·29	**0·35**	0·28
London	0·35	0·40	0·35	0·33	0·32	**0·35**	0·26
City of Manchester ...	0·41	0·44	0·38	0·50	0·34†	**0·41**	0·33†
Manchester Township ...	0·41	0·55	0·25	0·70	0·30	**0·44**	0·34
North Manchester.....	0·48	0·42	0·24	0·47	0·27	**0·38**	0·41
South Manchester	0·36	0·39	0·55	0·42	0·40†	**0·42**	0·26†
*142 Smaller Towns	0·30	0·22	0·28	0·35	0·23	**0·28**	0·20
Rural Districts	0·25	0·22	0·22	0·27	0·20	**0·23**	0·19

* The rates for 1901 are for the 33 Great Towns and 67 Smaller Towns, and for 1902 and 1903 103 Smaller Towns.

† Exclusive of Moss Side and Withington.

Whooping Cough was, in 1906, most fatal in North Manchester. From the table given below we see that, so far as individual districts are concerned, the highest death-rates were experienced in Ancoats, Blackley, Harpurhey, Moston, Newton, and Ardwick. Here, also, as in Measles, we note the tendency of the disease to be restricted to particular areas and districts, and to spread otherwise than along tram routes.

The following table shows the districts most affected :—

1906.—Deaths and Death-rates from Whooping Cough in the various divisions of the City.

Statistical Divisions		Estimated Population	Deaths	Death-rates
City of Manchester		**637,520**	**193**	**0·30**
I.	Manchester Township	128,040	44	0·34
II.	North Manchester	187,201	77	0·41
III.	South Manchester	322,279	72	0·22
I.	Ancoats	43,575	20	0·46
	Central	26,383	7	0·27
	St. George's	58,082	17	0·29
II.	Cheetham	41,004	8	0·20
	Crumpsall	9,301	2	0·22
	Blackley	9,573	4	0·42
	Harpurhey	20,989	14	0·67
	Moston	17,935	9	0·50
	Newton Heath	38,521	30	0·78
	Bradford	24,997	7	0·28
	Beswick	12,377	2	0·16
	Clayton	12,504	1	0·08
III.	Ardwick	44,261	21	0·47
	Openshaw	28,600	7	0·24
	Gorton (West)	31,529	10	0·32
	Rusholme and Kirk.	26,355	4	0·15
	Chorlton-upon-Medlock	56,361	11	0·20
	Hulme	64,062	13	0·20
	Moss Side	28,105	2	0·07
	Withington	43,006	4	0·09

This is not only a fatal, but a most distressing disease. The difficulties are largely of the same nature as those affecting Measles.

SUMMER DIARRHŒA.

In the Annual Report for 1905 it was shown that the great ascent which occurs in the third season of the year probably owns a specific cause, viz., the advent and increase of the housefly. By means of traps set in different parts of the City, a number of observations could be made and collected daily. These were again grouped in weeks and compared with the fatal cases commencing to be ill in the corresponding week, and with the fatal cases terminating in the following week. One hundred cases terminating fatally, which had been carefully investigated, were analysed as to the duration of their illness, and it was shown that within the first seven days 50 attacks terminated; in the second week of illness 25, in the third week 8, in the fourth week 5, above the fourth week 12.

From a study of the daily curves, it appears that an increase in flies tends to precede an increase in fatalities by three or four days.

The period between infection and development of Diarrhœa must therefore be frequently brief, and in many cases the disease must be exceedingly rapid in its course.

There is independent evidence of the former position.

The facts for 1905 are here reproduced.—(See tables, pages 83 and 84).

Both of these sets of facts are subject to serious deductions. It is often exceedingly difficult to ascertain any date at which the fatal attack commenced. It requires great patience and care to elicit the exact history. Even then the fatal attack often shades off imperceptibly into previous illness. On the whole, it is safer to use the figures showing the number terminating fatally in any given week.

Nevertheless, it is clear that there is a close correspondence between the number of flies caught in any one week and the number of fatal cases commencing in the same week or terminating in the following week, even upon the very partial count of flies shown in these observations.

The increase of flies also commences before the increase in fatal cases.

It is probable, therefore, that the relation is one of cause and effect. These observations, however, fall far short of absolute proof. To obtain absolute proof we should have to show that as a matter of fact flies do carry organisms capable of setting up Summer Diarrhœa. When this has been proved, however, the figures just given acquire great additional value, and approach proof. It is necessary then, in strictness, to show that the increase of flies and the increase of deaths from Summer Diarrhœa are not due to a common cause. This is quite a possible thing to do, and indeed it was partially shown in last year's report. To procure absolute proof, however, would entail a considerable expenditure in money and an immense expenditure in labour.

1905.—The Weekly Deaths from Diarrhœa arranged according to dates of onset, and also according to date of death, are shown in the following table, along with the number of Flies captured during the same weeks in 14 traps at 12 stations.

	June		July					August				September				
	17	24	1	8	15	22	29	5	12	19	26	2	9	16	23	30
Fatal cases of Diarrhœa in children under 1 year of age, beginning in week ending..	10	9	15	12	39	58	79	72	61	51	37	21	12	12	8	4
No. of flies captured	1527	1768	2253	2788	4456	7799	9493	9627	8542	7112	6112	5309	5138	3815	2978	1380
No. of deaths occurring in....	5	4	4	7	7	22	62	81	89	67	81	61	61	42	20	15

Side by side with these we may place the facts for 1906 (17 traps were used at 17 stations).

	May		June					July					
	19	26	2	9	16	23	30	7	14	21	28		
Fatal cases of Diarrhœa in children under 1 year of age, beginning in week ending.....	1	3	3	4	3	3	5	7	9	3	20		
No. of flies captured	72	187	467	1094	1167	2561	1984	3489	4909	7852	9280		
No. of deaths occurring in	3	1	2	5	3	1	3	4	6	6	12		

	August				September					October			
	4	11	18	25	1	8	15	22	29	6	13	20	27
Fatal cases of Diarrhœa in children under 1 year of age, beginning in week ending.....	44	74	81	68	88	65	28	20	17	12	4	5	6
No. of flies captured	12144	16101	16303	16605	23572	23144	19749	13421	10651	11976	6873	2685	3349
No. of deaths occurring in	17	34	80	102	104	135	136	86	58	35	28	11	13

This subject will be more fully considered on another occasion, but it may be said that the figures already adduced, the considerations discussed in the report for 1905, and the investigation about to be given, go far to establish the connection between increase in number of the housefly and increase in fatality from Diarrhœa.

Last year, by the instruction of the Sanitary Committee, I requested Professor Delépine to investigate the power of houseflies to carry organisms such as he considered to be associated with the production of Summer Diarrhœa.

Accordingly he devised the plan of procedure mentioned in the following report, and we collected for him flies from suitable positions, some in the near vicinity of cases of Diarrhœa, others not.

As the final outcome of his work, he finds that in 4 out of 35 collections sent to him the housefly was proved to be carrying bacilli of the coli type.

It will be noted that in all cases only a very few flies were trapped, and that these bacilli were found in the cultures made from the largest number of flies.

But in fatal cases of Summer Diarrhœa we find that flies have been present, and have had access to food, in immense numbers.

This investigation may, therefore, be taken as proving that houseflies do contaminate the food of infants to a sufficient extent to produce Diarrhœa.

PROFESSOR DELEPINE'S INVESTIGATION.

"Public Health Laboratory,
"York Place, Manchester,
"L.B. 1,700—1,781. "December, 1906.

"Dear Dr. Niven,—I enclose report upon 31 batches of flies which you sent me for bacteriological examination during the months of July and August of this year. Although the bacteriology of Epidemic Diarrhœa is still in an unsettled state, there is a fair amount of evidence indicating that this type of Diarrhœa is connected with the presence of bacteria of the bacillus coli group or of allied bacilli, and in this preliminary investigation it appeared to me that our object should be chiefly to ascertain to what an extent flies were capable of carrying these bacteria about.

"Other fæcal bacteria were also looked for.

"The report has been prepared by Dr. Sellers, whom I asked to conduct the bacterioloigcal examinations.

"Yours very sincerely,
"SHERIDAN DELEPINE."

Report on the bacteriological examination of thirty-one specimens of houseflies.

During the months of July and August, 1906, thirty-one batches of houseflies were collected and sent to Professor Delépine for examination.

Professor Delépine asked me to undertake the work. The general plan of the investigation and the methods used were decided upon in consultation with him.

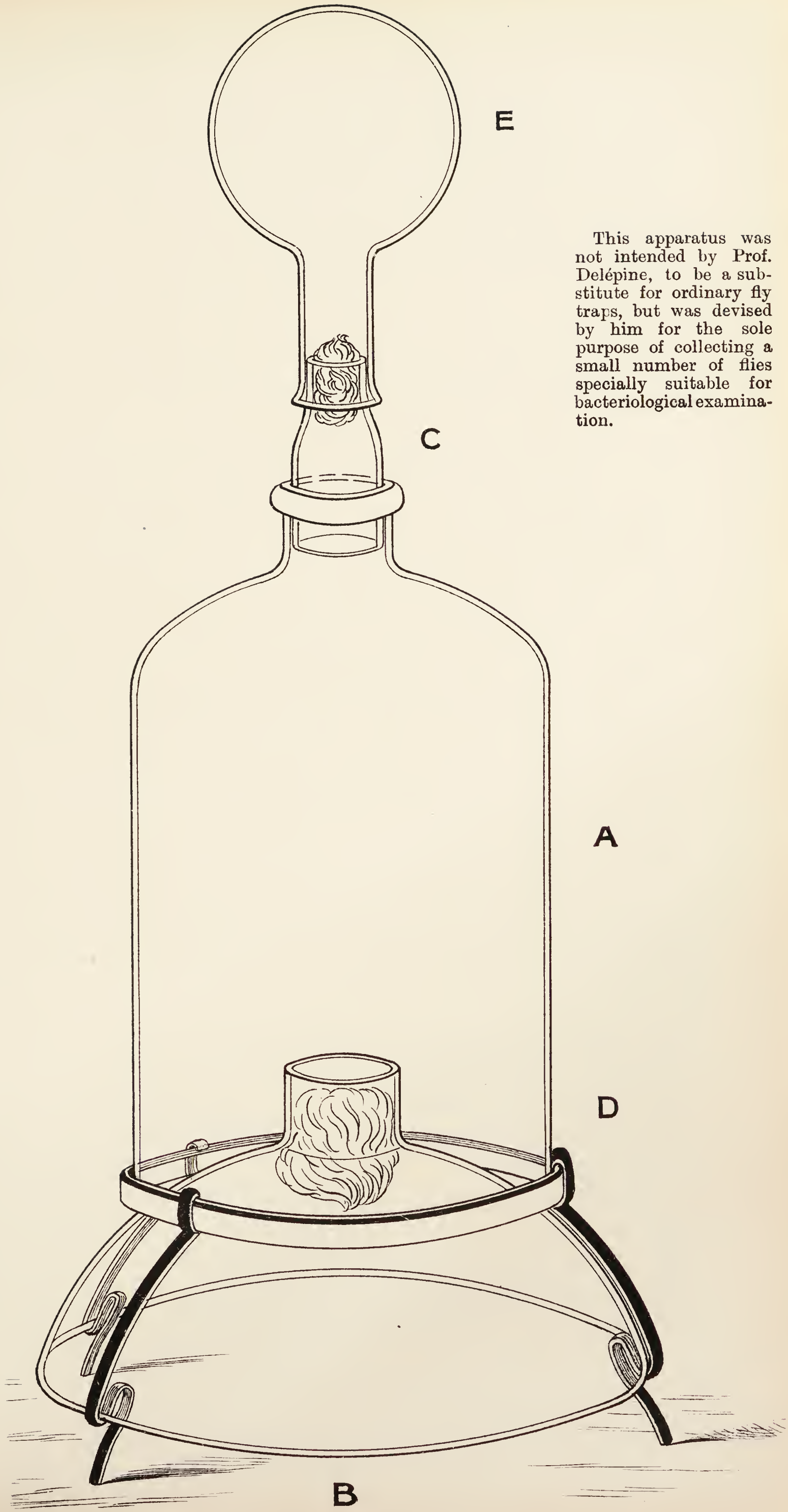
In examining these specimens the chief objects were to search for bacteria of the bacillus coli group, and to test roughly the number and kinds of bacteria present in the bodies and appendages of houseflies.

Mode of Capture.—Ordinary methods of capturing flies being unsuitable for bacteriological purposes, it was necessary to obtain some kind of trap which should (1) do away with any chance of accidental contamination at the time of catching by the hands of the operator or objects such as walls, tables, etc., (2) not require the use of any fluid inside the trap. When flies are caught in fluid, as in some ordinary traps, the fluid becomes rapidly loaded with bacteria and moulds by the rapid multiplication of the bacteria derived from the flies. The number present in the fluid, therefore, does not afford any reliable indication of the number actually present on the flies at the time of capture. (3) A trap was needed capable of being completely sterilised and dried before being sent from the laboratory, and of convenient size and form for subsequent treatment.

Description of Trap.—After some trials, Professor Delépine finally devised an apparatus, which was used in the greater number of cases. It consisted of a cylindrical glass jar (A), closed below by a glass funnel (B), the two being attached by strips of adhesive plaster and a simple arrangement of wire, which could also be used as a kind of stand for the whole. The upper end of the jar was closed by a cork, through which a short glass tube (C) was passed. Before being sent from the laboratory the neck of the funnel (B) was closed by a cotton-wool plug (D), and its wide opening by a sheet of sterilised filter paper. The opening of the tube (C) was closed by cotton-wool. The whole apparatus was then sterilised in the autoclave, and afterwards thoroughly dried.

This apparatus was not intended by Professor Delépine to be a substitute for ordinary fly traps, but was devised by him for the sole purpose of collecting a small number of flies specially suitable for bacteriological examination.

For use the filter paper and plug D were removed, and the trap left in any suitable place till a sufficient number of flies had been caught. The plug D



This apparatus was not intended by Prof. Delépine, to be a substitute for ordinary fly traps, but was devised by him for the sole purpose of collecting a small number of flies specially suitable for bacteriological examination.

was then replaced by a fresh sterilised plug, and as soon as possible the trap was sent to the laboratory. In some cases the examination was commenced within a few hours of the time the flies were caught, but usually there was an interval of about 18 hours. In either case most of the flies were alive, and the inside of jar dotted over with matter deposited by them. Using this method of capture there could be no doubt that any bacteria subsequently found were derived from the flies, and nothing else.

Methods.—In each instance two separate tests were made, viz., with the flies themselves and with the material deposited on the inside of the jar.

(A)—The cotton-wool plug closing the tube C was removed and the tube immediately covered by a small inverted sterilised flask E. After a varying time a sufficient number of flies had passed from A to E. The flask was then removed in such a way as not to allow the flies to escape, and a known quantity of sterile water added The flask was then thoroughly shaken so as to wash the flies and remove, as far as possible, any bacteria adhering to them. With these washings, plate cultures were made. In some instances agar plates were used incubated at 37° C., in others gelatine plates incubated at 20° C., and in many both agar and gelatine. On the whole, gelatine plates gave the best results, from the fact that certain bacteria were frequently present having a tendency to spread all over the surface of agar plates, thus obscuring other colonies and making their enumeration and isolation rather difficult. A few trials showed that both plates gave practically the same number and kinds of colonies. Special culture media were not used, Professor Delépine being of the opinion that before pure cultures have been obtained the advantages offered by special media are more than counterbalanced by their disadvantages. A few trials were required to fix the number of flies to be treated, the quantity of sterile water for washing, the quantity of washings for making the plates, and so forth.

Whenever possible the colonies obtained on the plates were counted. But in many instances an exact count was impracticable, though it was always possible to decide whether they were very numerous or not. Thus in some cases the plates were too crowded, in others the presence of many liquefying bacteria caused difficulties, in others the colonies were more or less obscured by bacteria spreading widely over the surface of the plates. Therefore, in Table I. instead of numbers comparative terms are used, these terms being based on observed results reduced by calculation to bacteria per fly. This plan enables a kind of rough comparison to be made between the flies taken from different sources. The plates were counted on the third day and kept under observation till the fifth day.

As regards the actual number of bacteria present, it was found that considerable variations occurred. Generally speaking, a quantity of washings corresponding to a single fly yielded hundreds or even thousands of colonies.

In examining the plates with the naked eye and microscope, special attention was directed to a search for colonies resembling the bacillus coli or allied species. In addition, the general characters of the kinds of colonies were noted so as to obtain some idea of the various types most frequently found. Suspicious colonies, or what seemed to be fairly frequent types, were picked out and grown on agar or other media for further examination.

(B)—After allowing the remaining flies to escape, a known quantity of sterile water was poured into the jar A. This was used for washing the sides of the jar, any visible adhering particles being detached and broken up with a sterile spud. Plate cultures were made from these washings. The plates were examined, and suspicious colonies isolated as in method A.

Example.—Lab. No. 1778. Received 28/8/06. Method A. Four flies washed in 20 cc. water. Gelatine plates with $\frac{1}{4}$ cc. and $\frac{1}{10}$ cc. on 28/8/06. Examined 30/8/06. $\frac{1}{4}$cc. 30 small white opaque non-liquefying, 30 of coli type, a few non-pigmented liquefying. Three colonies selected. Bacteria per fly at least 1,200.

The following table gives the results of the examination of the plate cultures made by methods A and B:—

Explanation of Table I.—In column A the sign given indicates the number of bacteria per fly as ascertained by method A, *i.e.*, the number of bacteria in the washings of the flies divided by the number of flies taken in each instance. In column B the sign indicates bacteria per fly, *i.e.*, the number in the washings of the jar divided by the number of flies captured in the trap.

The sign x indicates—few, less than 100.

,, xx ,, numerous, less than 1,000.

,, xxx ,, very numerous, more than 1,000.

The column "Prevailing Type" gives an indication of the various types of colonies present.

The sign given in the column "Bacillus Coli" indicates the presence or absence, without reference to numbers, of *suspicious colonies*, bearing some resemblance to the bacillus coli or allied species, as ascertained by methods A and B taken together.

TABLE I.—EXAMINATION OF PLATE CULTURE.

Lab. No.	Place and Date	Number of Flies		Number of Colonies per Fly		Prevailing Types (A and B together)	Bacillus Coli Type (A and B together)
		For Method A	Captured in Trap	Method A	Method B		
1700	Mill St. Police Station. 27/7/06	3	3	xxx	xxx	Small white non-liquefying. Liquefying non-pigmented	None found
1701	7, West St., Clayton. 27/7/06	2	12	xx	xx	Small white non-liquefying. Liquefying non-pigment. Pink liquefying	x
1702	Mill St. Police Station. 27/7/06	3	4	x	xx	Moulds. Yellow liquefying. Yellow non-liquefying. Pink non-liquefying. Liquefying non-pigmented	None found
1705	7, West St., Clayton. 28/7/06 ..	3	20	xxx	xx	Small white and yellow non-liquefying. Moulds	x
1717	33, Cannel St., Ancoats. 3/8/06	2	10	xx	x	Moulds. Small white non-liquefying. Liquefying non-pigmented	None found
1719	39, Cannel St., Ancoats. 4/8/06	2	8	x	x	Small white non-liquefying. Liquefying non-pigmented	None found
1720	38a, Pott St. Dwellings. 4/8/06	2	4	xxx	x	Moulds. Small white non-liquefying. Liquefying non-pigmented. Yellow non-liquefying	None found
1730	1, Melbourne Place, Hulme. 4/8/06	2	4	xx	x	Small white non-liquefying. Liquefying non-pigmented	None found
1731	3, Lilly Court, Hulme, 9/8/06 ..	2	4	xxx	xx	Liquefying non-pigmented. Yellow liquefying. White non-liquefying	None found

TABLE I.—*continued.*

Lab. No.	Place and Date	Number of Flies		Number of Colonies per Fly		Prevailing Types (A and B together)	Bacillus Coli Type (A and B together)
		For Method A	Captured in Trap	Method A	Method B		
1732	5, Leek Court, Hargreaves St., Hulme. 9/8/06	2	6	xxx	x	Small white non - liquefying. Liquefying non-pigmented	x
1733	39, Bradshaw St., Hulme. 9/8/06	2	8	xxx	x	Liquefying non - pigmented. Yellowish liquefying	None found
1741	24, Ross St., West Gorton. 13/8/06	5	about 20	xxx	xxx	Small white non - liquefying. Liquefying non - pigmented. Proteus-like	x
1742	1, Grantham St., West Gorton. 13/8/06	5	about 20	xx	xx	Small white non-liquefying ..	x
1743	11, Rennie St., West Gorton. 13/8/06	5	about 20	xxx	xx	Small white non - liquefying. Large white non-liquefying	x
1744	10, Harvest St., West Gorton. 13/8/06	5	12	x	xxx	Small white non - liquefying. Large white non-liquefying	x
1753	2, Hancock St., Rochdale Rd. 16/8/06	5	about 20	xxx	xx	Small white non - liquefying. Proteus-like	None found
1754	9, Upper Lewis St., Rochdale Rd. 16/8/06	5	about 20	x	xx	Small white non - liquefying. Proteus-like	x
1755	76, Silk St., Ancoats. 16/8/06 ..	5	about 20	xx	x	Small white non-liquefying ..	x
1756	13, Nelson St., Rochdale Rd. 16/8/06	5	about 20	xx	x	Small white non-liquefying ..	x
1758	39, Gunson St., Rochdale Rd. 20/8/06	5	8	xxx	xxx	Colonies spreading over surface of medium. Small white	None found
1759	9, Lloyd St., Oldham Rd. 20/8/06	5	8	xxx	xxx	Small white. Proteus-like ..	x

TABLE I.—*continued.*

Lab. No.	Place and Date	Number of flies		Number of Colonies per fly		Prevailing types (A. and B. together)	Bacillus Coli type (A and B together)
		For Method A.	Captured in trap	Method A.	Method B.		
1760	173, Cobden St., Ancoats. 20/8/06	5	8	xx	xx	Spreading colonies. Small white. Yellow non-liquefying	None found
1761	160, Cobden St., Ancoats. 20/8/06	5	8	xxx	xx	White non-liquefying. Many of Coli type	x
1763	79, Jersey St.	5	10	xxx	xxx	Yellow liquefying	None found
1764	23/8/06	5	7	xxx	xx	Red liquefying. Thick yellow non-liquefying. Liquefying non-pigmented	None found
1765	84, Beaumont St., Beswick. 23/8/06	5	about 20	xxx	xxx	Yellow liquefying	None found
1766	8, Burns St., Bradford. 23/8/06	5	about 20	xxx	xxx	Yellow liquefying	None found
1778	181, Oldham Rd. Dwellings. 27/8/06	4	8	xxx	xx	Small white non- liquefying. Liquefying non-pigmented. Coli-like. Thick opaque white	x
1779	112, Harrowby St., Rochdale Rd. 27/8/06	5	8	xxx	xx	Small white non - liquefying. Coli-like	x
1780	141, Hamilton St., Rochdale Rd. 27/8/06	5	about 20	xxx	xxx	Small white non - liquefying. Coli-like	x
1781	203, Oldham Rd. Dwellings. 27/8/06	5	about 20	xx	x	Small white non - liquefying. Liquefying non-pigmented	None found

Thus, in 15 of the 31 sets of flies examined, bacteria were found yielding colonies resembling in some degree those of the bacillus coli or allied species. These suspicious colonies were used for the inoculation of agar tubes. Cover-glass preparations from the tubes were stained with weak carbol-fuchsin. If on microscopical examination the bacteria bore any resemblance to the bacillus coli, a second cover-glass preparation was stained by Gram's method. Table II. gives the results of these tests. The table does not include the whole of the cultures examined in this way. In most cases three or four suspicious colonies obtained from each set of flies were cultivated and examined.

TABLE II.

No.	Stained by carbol-fuchsin.	Re-action to Gram.
1701	Large coccus	—
1705	Medium bacillus	Not stained
1732	Medium bacillus	Not stained
1741	Thick bacillus	Stained
1742	Medium bacillus	Stained
1743	Small coccus	—
1744	Small bacillus	Not stained
1754	Thick bacillus	Not stained
1755	Very minute bacillus	Not stained
1756	Medium bacillus	Not stained
1759	Small coccus	—
1760	Small coccus	—
1778	Small bacillus	Not stained
1779	Small bacillus	Not stained
1780	Small bacillus	Not stained

Thus a considerable number of the suspicious bacteria isolated in pure culture differed in microscopical characters or reaction to Gram from the members of the bacillus coli group. They could therefore be excluded. The remaining ones were subjected to a further series of tests, with the results given in Table III.

TABLE III.—PURE CULTURES GROWN ON VARIOUS MEDIA.

No.	Agar Peptone Bouillon	Litmus lactose agar	Milk	Peptone Bouillon	Potato	Glucose gelatine shake	Indol, 7 days incubation	Mobility	Gram
1705	24 hours.—Thin. Coli-like	Alkaline	Not clotted. Unchanged	Turbid. No pellicle	Rather thin pale yellow	Much gas	..	Moderate	Not stained
	7 days.—Thin. Coli-like	Alkaline	Not clotted. Partially cleared	Turbid. No pellicle	Rather thin pale yellow	Much gas. No liquefaction	Moderate	..	..
1732	24 hrs.—Thin. Transparent	Alkaline	Not clotted. Unchanged	Turbid. No pellicle	Almost invisible, pale	No gas	Copious	Moderate	Not stained
	7 days.—Thin. Transparent	Alkaline	Not clotted. Unchanged	Turbid. No pellicle	Almost invisible, pale	No gas. No liquefaction	..	..	..
1744	24 hours.—Thin. Coli-like	Unchanged	Not clotted. Unchanged	Turbid. No pellicle	Pale thin	No gas	Moderate	Doubtful	Not stained
	7 days.—Thin. Coli-like	Unchanged	Not clotted. Unchanged	Turbid. No pellicle	Pale thin	No gas. No liquefaction	..	..	..
1756	24 hrs.—Thin. Opaque	Unchanged	Not clotted. Unchanged	Not tested	Pale thin	No gas	None	Not tested	Not stained
	7 days.—Thin. Opaque	Unchanged	Not clotted. Unchanged	....	Pale thin	No gas ; slowly liquefied	..	..	..
*	24 hrs.—Rather thick, opaque	Unchanged	Unchanged Not clotted.	Turbid. No pellicle	Pale thin	No gas	Moderate	Slight	Not stained
1778 (A)	7 days.—Rather thick, opaque	Unchanged	Clotted	Turbid. No pellicle	Thicker, brownish	No gas. No liquefaction	..	..	..

TABLE III.—*continued.*

No.	Agar Peptone Bouillon	Litmus lactose agar	Milk	Peptone Bouillon	Potato	Glucose Gelatine shake	Indol. 7 days incubation	Mobility	Gram
*	24 hrs.—Rather thick, opaque	Unchanged	Not clotted. Unchanged	Turbid. No pellicle	Pale thin	No gas	Moderate	Slight	Not stained
1778 (B) Col. 1	7 days.—Rather thick, opaque	Unchanged	Clotted	Turbid. No pellicle	Thicker, brownish	No gas. No liquefaction	..	..	..
*	24 hours.—Rather thin	Acid	Not clotted.	Turbid. No pellicle	Pale thin yellow	Much gas	Moderate	Slight	Not stained
1778 (B) Col. 2	7 days.—Rather thin	Acid	Clotted. Partially cleared	Turbid. No pellicle	Pale thin yellow	Much gas. No liquefaction	..	..	..
1779	24 hrs.—Rather thick, opaque	Acid	Not clotted	Turbid. No pellicle	Pale thin yellow	Much gas	Moderate	Active	Not stained
	7 days.—Rather thick, opaque	Acid	Soft clot	Turbid. No pellicle	Pale thin yellow	Much gas. No liquefaction	..	..	..
*	24 hours.—Rather thin	Unchanged	Not clotted. Unchanged	Turbid. No pellicle	Pale thin	No gas	Trace	Slight	Not stained
1780 (A) Col. 1	7 days.—Rather thin	Unchanged	Soft clot	Turbid. No pellicle	Pale thin	No gas. No liquefaction	..	..	..
*	24 hrs.—Rather thick	Acid	Not clotted	Turbid. No pellicle	Pale thin	Much gas	Trace	Slight	Not stained
1780 (A) Col. 2	7 days.—Rather thick	Acid	Firmly clotted	Turbid. No pellicle	Pale thin	Much gas. No liquefaction	..	..	..
*	24 hrs.—Rather thick	Acid	Not clotted	Turbid. No pellicle	Pale thin	Much gas	Trace	Slight	Not stained
1780 (B) Col. 1	7 days.—Rather thick	Acid	Firmly clotted	Turbid. No pellicle	Pale thin	Much gas. No liquefaction	..	..	..

*In some instanees the reactions of more than one culture obtained from the same set of flies are given. The Table does not include the whole of the cultures tested. Many of the bacteria isolated in pure culture were clearly not members of the bacillus coli group.

From this table it will be seen that many of the suspicious bacteria failed to give certain reactions characteristic of the bacillus coli group. There were five which clearly belonged to the bacillus coli group, viz. :—1705, 1778 (B) Col. 2, 1779, 1780 (A) Col. 2, and 1780 (B) Col. 1.

No. 1705 might be described as resembling the bacillus enteritidis. The rest are fairly typical coli bacilli, though all of them seem to produce only a small quantity of indol.

With four of these bacteria, two sets of experiments on guinea pigs were made. No. 1780 (A) Col. 2. was clearly identical with 1780 (B) Col. 1, and was therefore not tested :—

I.—Subcutaneous injection of 1 cc. of a three days' old culture in bouillon into the left hind leg.

II.—Feeding experiments. Each animal received 5 cc. of a culture in milk on each of three successive days.

The results are given below.

I. 1705.—Guinea-pig weighing 10 ozs. In 24 hours there was some swelling of the thigh, which lasted for three or four days. The animal had quite recovered in 8 days. It was killed by chloroform in 15 days. No lesions were present.

1778 (B) Col, 2.—Weight 24 ozs. In 24 hours there was much swelling of the thigh, and the animal was evidently very ill. In 8 days the swelling had become an abscess of large size, which burst, leaving an ulcer. The animal was killed by chloroform in 15 days. The ulcer was then healing, but the thigh was still swollen and œdematous. The liver was dark and mottled. The spleen considerably enlarged and mottled. The bacillus was recovered by cultivation from the local lesion and spleen.

1779.—Weight 12 ozs. Dead in less than 18 hours. There was a moderate amount of gelatinous œdematous fluid about the seat of inoculation, extending as far as the inguinal region. The peritoneal cavity contained much blood-stained fluid. There was extensive acute early peritonitis affecting the visceral and parietal layers. The spleen was considerably enlarged and congested. The blood was very dark and treacly. The bacillus was recovered from the blood, peritoneal fluid and local œdema.

1780 (B), Col. 1.—Weight 16 ozs. In 24 hours there was some swelling of the thigh, which in 10 days had become an abscess. In 15 days the animal was killed by chloroform. The abscess had then burst, leaving a large ulcer, and the thigh was still swollen and œdematous. The spleen was considerably enlarged, congested, and mottled. The bacillus was recovered from the local lesion, but could not be obtained from the spleen.

II. *Feeding Experiments.*—None of the animals fed with milk culture showed any sign of illness.

Conclusion.—In four instances bacteria were present, having microscopical and cultural characters resembling those of the bacillus coli group, but they do not all belong to the same kind or variety. There were certainly two, and probably three, types as represented by 1705, 1779, 1778 (B) Col. 2, and 1780 (B) Col. 1. No. 1705 resembled the bacillus enteritidis of Gärtner, but on subcutaneous inoculation it produced only a transient lesion.

The lesions produced by 1780 (B) Col. 1 and 1778 (B) Col. 2 were of a similar kind, and on the whole resembled those frequently produced by the bacillus coli, though certain divergences were noted. The lesions produced by No. 1779 were quite different from those produced by typical bacillus coli.

The grouping indicated by cultural characters is also shown in the lesions produced by subcutaneous inoculation.

A. SELLERS.

As the practical application of this research, we must endeavour to prevent the development of the house-fly, and to destroy the larva when we cannot prevent its growth. The surest means to prevent the larva from developing into the house-fly in the City is to remove and deal with all horse manure and other generative filth and refuse within the period necessary for development, which may roughly be put at one week.

It was shown in the Annual Report for 1905 that direct infection comes powerfully to the aid of other means of spread. This can only be dealt with by instruction.

This is also true of bad feeding, dirt, and other consequences of maternal ignorance. This subject, however, will be further considered.

It seems to me necessary to state that it has not been possible to investigate specially more than 50 cases in 1906, while during the present year it will not be possible to devote any special attention to the subject. When I state that the Sanitary Inspectors failed to find, on account of removal and other causes, as many as 132 out of a total of 981, and that these failures are, of course, most numerous when the deaths are most numerous, it will be understood why the facts of flies and deaths do not correspond so closely as they should do.

Apart from that, this is work for a special practised investigator, and if this important subject is to be cleared up, the necessary staff will require to be provided.

The following tables for 1906 show the distribution of fatal Diarrhœa in periods of the year and in sanitary districts. They permit of a comparison with other towns and with the country generally. The meteorological data which stand in relation with Diarrhœa are also given :—

1906.

DEATHS FROM DIARRHŒAL DISEASES IN MANCHESTER IN THE WEEKS ENDING ON THE DATES GIVEN BELOW.

FIRST QUARTER		SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER	
Jan. 6	1	April 7	3	July 7	4	Oct. 6	35
,, 13	2	,, 14	2	,, 14	6	,, 13	28
,, 20	2	,, 21	4	,, 21	6	,, 20	11
,, 27	2	,, 28	2	,, 28	12	,, 27	13
Feb. 3	3	May 5	5	Aug. 4	17	Nov. 3	16
,, 10	3	,, 12	3	,, 11	34	,, 10	9
,, 17	2	,, 19	3	,, 18	80	,, 17	5
,, 24	5	,, 26	1	,, 25	102	,, 24	2
Mar. 3	3	June 2	2	Sept. 1	104	Dec. 1	2
,, 10	2	,, 9	5	,, 8	135	,, 8	4
,, 17	3	,, 16	3	,, 15	136	,, 15	3
,, 24	...	,, 23	1	,, 22	86	,, 22	1
,, 31	4	,, 30	3	,, 29	58	,, 29	3
Total...	32	Total...	37	Total ...	780	Total ...	132

City Total 981

The number of deaths in quarters is shown for successive years.

DIARRHŒA AND SIMPLE CHOLERA DEATHS IN QUARTERS, 1896–1906.

	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	Mean for 10 years	1906
First Quarter.....	37	49	55	46	41	45	33	48	34	23	**41**	32
Second Quarter...	78	50	49	53	66	32	33	49	38	31	**48**	37
Third Quarter.....	391	803	807	948	562	865	120	303	626	615	**604**	780
Fourth Quarter...	66	62	179	74	153	74	110	107	63	60	**95**	132
	572	964	1090	1121	822	1016	296	507	761	729	**788**	981

1906.—Deaths and Death-rates from Diarrhœal Diseases in the various Divisions of the City.

	Estimated Population	Deaths	Death-rates	Death-rates under one year per 1,000 Births												
				1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	Average 10 years	1906
City of Manchester ..	**637,520**	**981**	**1·54**	**24·8**	**39·1**	**46·3**	**63·7**	**35·6**	**47·5**	**13·0**	**22·1**	**34·1**	**30·8**	**36·0**	**39·8**
I. Manchester Township.	128,040	336	2·62	30·0	45·4	54·6	78·5	47·5	61·6	16·6	31·3	40·9	47·7	45·9	58·5
II. Northern Districts ...	187,201	230	1·23	19·6	34·8	37·3	57·4	24·4	42·3	10·7	15·0	30·1	31·3	30·1	30·8
III. Southern Districts....	322,279	415	1·29	24·3	37·7	46·7	58·7	36·1	43·2	12·4	22·0	33·0	22·5	33·9	36·7
I. Ancoats	43,575	125	2·87	30·7	58·3	45·3	85·0	48·6	57·4	17·1	30·2	35·4	50·9	46·0	54·9
I. Central	26,383	53	2.01	46·6	45·2	75·2	71·1	55·0	66·1	15·0	48·5	51·0	52·4	53·9	54·9
I. St. George's	58,082	158	2·72	20·8	36·0	52·8	76·7	43·4	63·3	16·9	25·5	41·1	43·3	42·3	62·8
II. Cheetham	41,004	28	0·68	20·1	22·5	22·6	36·0	18·0	27·3	9·4	10·1	10·7	18·8	19·1	19·6
II. Crumpsall	9,301	6	0·65	16·1	26·3	20·4	60·9	14·6	23·2	14·9	9·8	15·2	23·9	22·0	20·7
II. Blackley	9,573	4	0·42	4·7	4·4	9·8	44·2	4·4	9·2	4·0	12·1	23·5	3·8	12·0	3·5
II. Harpurhey	20,989	24	1·14	24·7	42·6	44·7	72·6	11·3	36·5	1·8	15·9	13·1	21·7	27·5	40·1
II. Moston	17,935	8	0·45	9·1	17·5	51·0	29·1	2·8	19·0	11·7	8·8	25·5	8·4	19·0	13·2
II. Newton Heath	38,521	55	1·43	15·7	32·9	37·8	57·9	25·4	49·7	12·3	15·6	31·4	43·3	31·9	36·0
II. Bradford	24,997	64	2·56	24·9	49·8	58·1	93·3	43·3	62·7	13·2	26·9	52·5	47·7	46·8	53·6
II. Beswick.....	12,377	18	1·45	20·3	52·5	23·6	46·4	40·6	50·0	20·6	8·4	60·8	43·2	38·1	23·0
II. Clayton	12,504	23	1·84	41·4	55·2	61·6	66·7	36·4	94·9	6·2	20·2	38·4	40·1	44·0	41·2
III. Ardwick	44,261	73	1·65	19·2	27·7	50·2	61·7	43·7	48·4	11·5	20·0	38·5	28·7	34·0	42·8
III. Openshaw	28,600	58	2·03	25·7	42·6	58·5	64·3	44·7	48·1	14·2	27·4	28·0	23·9	37·9	50·0
III. West Gorton	31,529	65	2·06	21·4	42·7	69·3	85·7	52·6	58·4	21·2	31·1	47·2	35·1	47·5	60·0
III. Rusholme and Kirk ..	26,355	21	0·80	17·2	26·3	43·7	34·0	15·4	33·3	11·6	14·0	12·7	10·5	20·0	21·2
III. Chorlton-on-Medlock .	56,361	54	0·96	28·7	24·2	32·8	58·7	25·1	17·9	7·1	23·9	23·8	29·1	27·8	32·8
III. Hulme	64,062	106	1·65	26·3	50·3	40·6	49·5	33·1	43·6	12·0	18·7	39·2	22·3	34·4	33·6
III. Moss Side	28,105	18	0·64	..	..	..	..	..	..	..	..	..	3·5	..	29·8
III. Withington	43,006	20	0·47	..	..	..	..	..	..	..	..	..	11·2	..	19·4

1906.—Diarrhœa and Simple Cholera Mortality.—Rate per 1,000 living, compared with Mean of Five Years.

	1901	1902	1903	1904	1905	Mean	1906
England and Wales	0·91	0·38	0·50	0·86	0·59	**0·65**	0·87
*76 Great Towns	1·23	0·54	0·71	1·20	0·83	**0·90**	1·16
London	0·87	0·54	0·64	1·04	0·73	**0·76**	0·94
City of Manchester.....	1·86	0·54	0·91	1·36	1·15	**1·16**	1·54
Manchester Township	2·72	0·73	1·41	1·86	2·09	**1·76**	2·62
North Manchester.....	1·61	0·44	0·64	1·16	1·14	**1·00**	1·23
South Manchester	1·56	0·50	0·84	1·25	0·79	**0·99**	1·29
*142 Smaller Towns†	1·09	0·35	0·43	1·90	0·57	**0·67**	0·94
Rural Districts	0·65	0·22	0·31	0·46	0·32	**0·39**	0·52

* The rates for 1901 are for the 33 Great Towns and 67 Smaller Towns.
† The rates for 1902-3 are for 103 Smaller Towns.

The following table supplies meteorological data for the third quarter of the year, the season in which the disease is most prevalent:—

Third Quarter of the years	Mean Temperature	Rainfall, Inches	Humidity, per cent.	Diarrhœa and Simple Cholera Mortality. Annual Rate per 1,000 living
1888	56°·5	11·2	77 %	1·36
1889	57°·7	10·5	73 %	2·61
1890	58°·8	8·1	74 %	2·28
1891	58°·2	12·8	79 %	1·57
1892	57°·0	12·5	78 %	2·07
1893	60°·4	10·7	74 %	4·95
1894	57°·8	9·0	78 %	1·55
1895	60°·4	11·2	77 %	4·17
1896	58°·5	9·7	76 %	2·93
1897	58°·9	9·7	73 %	6·01
1898	60°·1	6·1	74 %	6·00
1899	60°·8	7·7	75 %	6·96
1900	60°·3	9·6	78 %	4·14
1901	61°·9	6·5	74 %	6·33
1902	57°·6	5·9	78 %	0·88
1903	57°·8	12·3	77 %	2·19
1904	60°·2	6·9	73 %	4·48
1905	58°·9	9·4	76 %	3·89
Mean	**59°·0**	**9·4**	**76 %**	**3·58**
1906	60°·8	6·2	75 %	4·91

THE PREVENTION OF TUBERCULOSIS.

Part I.

More and more attention is being given to this vast and complicated subject, and it is no easy matter to maintain a steady position among the changing views as to the modes of propagation and the methods of prevention. Yet, my conviction is that the course which was chalked out here in 1899 has yielded, for the small means available, the greatest amount of result to be expected from municipal effort, because it was founded on a fairly just appreciation of the facts, and of the application to them of the agencies available. The points of failure, and the means by which they have been, or may, be remedied will be discussed in due course.

A communicable disease

Tuberculosis is a communicable disease, and is conveyable by inhalation, ingestion, and inoculation of the tubercle bacillus. The number of deaths ascribed in England and Wales in the year 1905 to Phthisis, which we may take to be roughly equivalent to Tuberculosis of the Lung, was 38,950, equivalent to a death-rate of 1·14 per 1,000. The number of deaths ascribed to all forms of Tuberculosis was 55,759, or more than one-tenth of all deaths in the year.

Conditions of the body favouring infection

Now, while it is true that Tuberculosis is a purely communicable disease, it is certain also that a considerable number of bacilli are requisite to produce the disease, the system being able to put forth sufficient effort to kill and carry out of the body a small dose of bacilli. But this power is dependent on a variety of factors. When tubercle bacilli have penetrated into the circulation, which they are apparently able to do with no great difficulty, should they arrive at any injured part of the body they find much less resistance there on the part of the tissues, and may grow, and from thence be carried to other parts. In this way Tuberculosis may assail portions of the body which have been accidentally injured. The whole system may be weakened by destitution, depression, or disease, and the resisting power may be so weak that the bacilli are able to effect a lodgment. The same result attaches to an initially feeble organisation. There can be little doubt that much inter-marriage tends to produce such feebleness of organisation. The surface of important organs may be much injured by disease, as, for example, the surface of the bowels by Enteric Fever, Diarrhœa, Alcoholism ; and the mucous membrane of the respiratory passages by Measles, Whooping Cough, Bronchitis, Pneumonia, Influenza, Alcoholism. In such a case the bacilli are able to grow on the impaired surface and to penetrate into the body from this point, finding their way thence to the lung.

Injuries of the mucous membrane of the mouth or nose are thus liable to lead to the introduction of the bacilli. Such injuries have a greatly increased effect when they are combined with a weakened system, and a system weakened by any cause is apt to be assailed by such local injuries.

Anæmia in youth, feebleness of constitution, and imperfect nutrition, whether resulting from a weak organisation or from insufficient or unsuitable food, all expose to the easier invasion of the bacillus.

From these considerations we see how important it is that the constitution should be strengthened by the avoidance of disease, by careful feeding, and by a sufficiency of wholesome exercise in the open air.

Disease produced by doses of infection

We must always remember, however, that the dose of infection and its repetition are of cardinal importance. By sufficient and repeated dosage with infection the strongest persons may be made to succumb, especially as they are liable to temporary depressions and catarrhs, whether from excesses, or as the result of watching the sick and want of rest. In this way it is that we must explain the terrible fatality of the healthy nurses in Catholic Nursing Institutions recorded by Cornet, the severity with which Phthisis formerly prevailed in English and French barracks, the excessive incidence of the disease in the inhabitants of common lodging-houses, and the frequency with which we see strong persons succumbing in presence of infection, whether at home or in the workshop.

Infection may enter the system by the alimentary canal

If, again, we are to obtain the best results in the way of prevention, it is important that we should know in what ways infection enters the system. Undoubtedly the infective matter passes, in the great majority of instances, from one person to another. But Tuberculosis is a widespread disease which afflicts man, monkeys, cattle, horses, pigs, goats, cats, and birds, and which is easily transferred to guinea pigs and rabbits. When Villemin's announcement of the infectious character of Tuberculosis was followed by strenuous resistance on the part of eminent physicians, that great veterinary surgeon Chauveau took up the subject experimentally, and showed that tuberculous matter derived from human beings when fed to cattle produced in them Tuberculosis.

The failure of some observers to obtain Tuberculosis in this manner he ascribed to the way in which the materials were given. Crude lumps of material, he pointed out, are taken into the rumen, where the tubercle bacilli undergo destruction under the action of fermentative processes. If, however, the material is finely divided and in liquid form, it is carried along the œsophageal groove to the third stomach.

Liquids pass, no doubt, direct to the fourth stomach, and here milk is changed to curds and whey.

It is probable that this change, again, interposes resistance to infection, the bacilli being entangled in the very hard curd which is formed in the stomach of the calf. It is probable that trypsin and other ferments act injuriously on the bacilli, and that a much larger dose of infection is necessary in milk than in water to produce the same effect.

In this way we may, possibly, explain the difference in the results obtained in feeding experiments by the Royal Commission and by some French observers.

It was the view of M. Chauveau that Tuberculosis, as it occurs in the different classes of animals, is one and the same. Subsequent observation, however, has shown that as regards its power to produce infection in ruminants, the tubercle bacillus of the bird is quite distinct.

On the other hand, the identity in the reaction produced in bovines by tuberculin, whether of human or bovine origin, isolated occurrences of the generation of Tuberculosis in man by the accidental inoculation of bovine tuberculous matter, and histories—sparse it is true, but striking—of infection from tuberculous milk, appeared to show that Tuberculosis in man and in the bovine is one and the same disease, or, at all events, that bovine Tuberculosis is communicable to man. It came rather as a surprise, therefore, when Koch, in 1901, expressed the contrary view, though, in face of well-known facts, no one was prepared to accept his conclusions out of hand.

The results of experimentation since that time have all gone steadily in the opposite direction, and undoubtedly the matter has been worked at with a degree of assiduity which would not have been accorded to it had it not been for Koch's expression of opinion.

In the result, all doubt on the subject may be said to have been removed, and it has become apparent, not only that bovine Tuberculosis is communicable to man, but that the bacillus of bovine Tuberculosis has greater virulence than the human bacillus, and that human Tuberculosis may arise from introduction of the bacillus of bovine Tuberculosis.

There are no means by which we can determine the proportion of tuberculous children who owe their attacks on the one hand to infection from some person, on the other to the ingestion of tuberculous milk, although it may be that the majority of the cases are of human origin.

The chief source of bovine Tuberculosis in man is milk

So far as infection from cattle is concerned, it is probable that the chief source of infection is tuberculous milk, though tuberculous meat may occasionally infect, if insufficiently cooked. It is hardly likely that tripe will be so imperfectly cooked as to infect. A much more serious source of infection is probably to be found in pork and ham. The pig is exceedingly liable to generalised Tuberculosis, and the cooking to which ham and bacon are submitted is often of the scantiest.

Human Tuberculosis conveyed by the discharges from diseased organs; especially from the lung

The danger from tuberculous meat and milk, however, is probably small compared with that attaching to intercourse between healthy people and consumptives. Tuberculosis in the human being is called 'open,' or 'closed,' according as matter may be discharged without the body from the part affected by the disease or not. Thus, Tuberculosis of the pleura, brain, joints, and bones is 'closed' unless an open sore has been formed; Tuberculosis of the lungs, bowels, or kidneys is 'open.' 'Open' Tuberculosis is, of course, the dangerous form of the disease, so far as infection is concerned.

It would not, however, be safe to assume that 'closed' Tuberculosis is free from risk. Tubercular meningitis, *e.g.*, is not unlikely to be associated with some abdominal lesion, although the latter may not attract attention.

The discharges in different forms of 'open' Tuberculosis do not appear to be equally infectious. Usually bacilli are much more numerous in mucous discharges from tuberculous ulcers of the mouth, throat, and lungs, or from intestinal affections, or from renal or bladder diseases, than in the pus derived from scrofulous sores, tubercular abscesses, or diseased bones. Yet it is necessary to remember that the discharges are, all of them, distinctly infectious.

It is to expectorated matters that attention has been specially directed. This is due to several facts: (1) to the enormous quantity of tubercle bacilli expectorated while a lung is in course of breaking down; (2) to the habit of expectorating in confined places, such as workshops, railway carriages, etc.; (3) to the resulting effect, viz., large accumulations of living tubercle bacilli attached to the dried dust resulting from sputum, which are liable at any time to become dispersed in the atmosphere; (4) to the ejection into the atmosphere of bacilli borne by fine spray, in the act of coughing, and even during speech. There is no doubt at all that infection is infinitely more abundant and more dangerous from expectoration than from any other source.

Abundant proof has been furnished that tubercle bacilli withstand drying, and remain alive and capable of infecting guinea-pigs for many months, when kept without access of light.

They are readily destroyed by the direct action of sunlight, a fact which Dr. Arthur Ransome, working with Professor Delépine, helped to make clear.

There is no proof that ventilation *per se* has any effect whatever on the tubercle bacillus. On the contrary, if injudiciously applied in a highly infected place, it may do more harm than good, by diffusion of bacilli.

People are much more alive to the harmfulness of expectoration now than they used to be, and one does not see many persons coughing up and spitting out matters. But expectoration used to be very common, and the persons who were careful about what they did with their expectorations were formerly much fewer than they now are.

Matters expectorated by a consumptive cause the dust in his room to be capable of conveying infection

Accordingly, it was to be expected that there would be in rooms inhabited by consumptives a good deal of tuberculous dust capable of infecting a guinea-pig when inserted beneath its skin, and capable when inhaled of producing Consumption in persons using the room.

Dr George Cornet, of Berlin, did a great service to practical administration when he showed, about the year 1886, that such dust can often be proved to be infectious. In fact, he found that in the majority of rooms occupied by consumptives who were not careful about their expectorations, the dust taken from places on which the consumptive could not have expectorated directly, is capable of producing tuberculosis in the guinea-pig.

These important enquiries were repeated in Manchester with a like result by Dr. Coates, now Medical Officer of Health for Hornsey.

If, now, we could remove from a house the infectious matter which has already accumulated from the presence of a case of Phthisis, and if, by instruction and other appropriate means, we could prevent further accumulation, we should go a long way towards the suppression of Phthisis.

This we have endeavoured to do, and if only a limited amount of effort is possible, it is in this way that it may be most profitably expended.

General outline of the action taken to remove infective matters

Great efforts have been made to secure the reduction of expectoration in common lodging-houses; while in workshops, by continued advice, undoubtedly much has been achieved.

As regards tuberculous milk, all that we have been able to do is to maintain a certain measure of control over the introduction into the City of tuberculous milk from without; while within the City, by frequent inspections on the part of the Veterinary Surgeon, tuberculosis of the udder is kept at vanishing point.

Tuberculous meat, again, is examined by the Veterinary Inspectors of the Markets Department, and while complete control is no doubt maintained over meat brought to the abattoirs, a fair measure of supervision is maintained over meat reaching other parts of the City.

It is, however, necessary to have a clear idea of what we have not been able to do.

First, with regard to expectorated matters.

Infection is conveyed by expectorated matters directly in the act of coughing, when these are forcibly expelled in small fragments.

Personal precautions taught to consumptive

In the earlier part of our work this danger was not taken into account at all. For the last year or two, however, the instruction in personal precautions has taken particular account of it. Consumptive persons are instructed at home to collect their expectorations in tarred or enamelled cardboard boxes, provided

with a lid, which are burned after use for 24 hours or less. While outside, or at work, they are instructed to use spit bottles, and printed instructions are supplied as to the proper means to be employed in cleansing these. They are also instructed in the use of paper handkerchiefs, which are to be used for coughing into, so that the spray is not scattered about, and are then put aside to be burned at the first opportunity. In the absence of complete precautions of this kind it is evident that phthisical persons, during their outbursts of coughing, will scatter infective matter over their clothing, and over the materials near them, so that much of the advantage gained by care of the expectorations will be lost. This will be particularly the case as between a consumptive mother and her children, whose faces are apt to come in contact with her dress.

Another danger arises during speech. As Dr. M. H. Gordon has shown, in forcible speaking bacilli are apt to be projected to considerable distances. This, however, is less liable to occur with tubercle bacilli, entangled as they are in sticky secretion, than it is with some other forms of bacilli, so that, in all probability, if we can guard against the conveyance of tubercle bacilli otherwise we need not be so much concerned as to this mode of infection, further than to observe that its existence is full justification of the periodic cleansings of houses inhabited by consumptives on which we have insisted.

Danger of increasing the extent of the disease from swallowing espectorated matters

In the case of children, again, and of many adults, expectorated matters are swallowed, and this is a danger which consumptive persons require to be specially cautioned about. Such matters are apt to produce intestinal tuberculosis, and, even when this result does not ensue, the bacilli are carried into the intestine and are liable to penetrate the walls, finding their way thence into the lymph circulation and so back to the lungs, there to set up fresh foci of tuberculosis. This may be supposed to have no direct bearing on infection, but, of course, every circumstance which accelerates the breaking down of the lung adds to the intensity of infection.

There is also another direction in which danger from expectoration requires to be more stringently watched. In his recent communications to the Annales de l'Institut Pasteur, Calmette has adduced reasons for believing that infection of the lungs is produced to a much greater extent than has hitherto been supposed to be the case by the swallowing rather than by the inhalation of tuberculous matters, the bacilli passing through the walls of the intestine and being carried thence to the lungs, where they are arrested, and set up tuberculous changes. Possibly he has carried his advocacy of this view to an extreme point, but, at the same time, both his observations and the experiments recorded by the Royal Commission emphasize the reality of this mode of transmission.

It is true, no doubt, that, supposing this were the only channel by which infection is able to penetrate the system, our general method of combating

Tuberculosis and the sources of infection would not thereby be altered. But, in fact, the points on which we should lay stress would be altered.

Precautions needed to prevent conveyance of human tuberculosis in the food

As regards the consumptive himself, we should have to insist much more on the cleansing of the mouth prior to a meal. It would be necessary also to pay great attention to the cleansing of the hands by a consumptive person, and by all persons engaged in dealing with adults or children affected with tuberculosis in any form, before either partaking of any food or handling food of any sort to be consumed by others. Such precautions would also be particularly needful for charwomen, laundresses, persons employed about common lodging-houses, etc., etc. Added emphasis would require to be laid on the necessity of sound persons not using unsterilised implements or utensils for eating or drinking which had been used by consumptives, and on their not partaking of food left by consumptives.

Notification of cases of Phthisis should be more complete

It is scarcely needful to say that we do not get nearly all cases of Phthisis notified to us. Perhaps of known cases of Phthisis we may get somewhat over one-half. In addition, there is a large number of cases of so-called Chronic Bronchitis which are in reality cases of slowly progressing Phthisis, although there may be long intervals without rapid progress or the presence of tubercle bacilli. A large number of the known cases which are not notified are under the care of medical men of the greatest skill, who are, no doubt, perfectly competent to give advice as to all necessary precautions. It is, however, not always easy to speak plainly on this subject, and, moreover, this is not the subject to which medical attendants usually give the greatest amount of attention. It would certainly be better for their patients if medical men could more largely notify their cases. But one quite understands how it comes about that they do not do so. Nor would it be easy to get all cases notified even under a system of compulsory notification. There would, however, be an advantage in this respect that more pressure could be used to get patients to submit to disinfection of their bedding and personal clothing than we can now use, and it is therefore desirable that the powers now possessed by Sheffield should be sought for Manchester.

Tubercular disease other than Phthisis requires more attention

A large field, moreover, has been left untouched, because that which we have already undertaken is larger than we can entirely overtake. All forms of Tuberculosis other than Phthisis have had necessarily to be left unnotified, and in chief measure undealt with. Of these, perhaps the most important are tuberculous affections of the bowel. Tuberculous disease of the kidney is also not uncommon. Now the discharges from the bowels and kidneys, and also from the bladder, when these organs are affected with Tuberculosis, are doubtless highly charged with infectious matter. It is, however,

not easy for the tubercle bacilli to escape from these discharges, though this is much more likely to happen with pail closets and middens than with water-closets. If, however, these affections are of common occurrence, and they are not uncommon, flies in summer and autumn may well help to spread Tuberculosis by conveyance of bacilli to food. A much more serious fact, however, is the soiling of the interior of the dwelling, and of the hands and clothes of the attendants, from abdominal Tuberculosis in young children. Doubtless, also, children are thus often infected one from another through the medium of soiled floors, etc.

It can scarcely be doubted that this is a not infrequent source of infection. Here, again, the question whether infection is chiefly abdominal or pulmonary becomes one of great importance, and the precautions to be taken require most careful consideration.

It is hoped that it may be possible to give increased attention to this source of infection, which has received notice so far only as an incident in the history of cases of Phthisis.

It will be manifest also that the same considerations apply to the discharges from scrofulous glands and from diseased bone, although the risk from this source may not be so great.

Much depends, again, on the manner in which the work is carried out. For the periodic inspection of houses, for judicious and tactful insistence on the carrying out of those measures of personal precaution in which instructions have been given, and for the maintenance of strict cleanliness and periodic disinfections, we are dependent on the District Sanitary Inspectors and on the visitors of the Ladies' Public Health Society.

According as this important part of the administration is or is not carefully conducted will be the degree of protection afforded. It is the custom in poor Manchester households to cover the floor with rag mats, which are simply receptacles for infection, and instruments for its diffusion. Amongst other duties it rests with the officers to dissuade householders from the employment of these dangerous floor coverings, and to induce them to use some material easily cleansed, such as linoleum.

It will be seen that we are far from dealing exhaustively with individual cases of Tuberculosis, and that hiatuses occur even in our efforts to remove specific infected matter from households. Nevertheless, a great effort has been made, the details of which are carefully arranged in the Tuberculosis Office by Mr. Lock, to remove infection by the withdrawal of sources of tuberculous milk, by the instruction of tuberculous persons in personal precautions with provision of requisite materials, by the reduction of expectoration in trams, workshops, common lodging-houses, public places, and possibly to some extent in public-houses, and also by the isolation of the most urgent cases.

The directions in which we may hope to reduce Tuberculosis most effectually may be said to be these—

General statement of the directions which we may try to diminish Phthisis

(1) By the improvement in physique of the population, especially of those persons specially exposed to tubercular infection, and by the diminution of those diseases and conditions which predispose to Phthisis;

(2) By the removal of dirt from the neighbourhood and from the interior of habitations;

(3) By removal of the specific infecting matters of Tuberculosis.

Suitable and sufficient isolation of cases of Phthisis in hospital must reduce the death-rate

Now it is evident that, if we could promptly isolate, and keep isolated until death or recovery, all cases of Tuberculosis, we must of necessity do more than by any other means to suppress infection and to reduce the number of cases. We are, of course, very far from contemplating such a possibility. But if we could produce a continuous diminution by means of isolation it might be worth while to make a great effort. It is quite certain that the great reduction in Phthisis which has taken place in recent years in Germany is not due to the development of Sanatoria, nor can Sanatoria in England be supposed seriously to have affected the great reduction which has taken place in the death-rate of this country from Phthisis. It is not denied, however, that a sufficient number of Sanatoria would produce a marked effect in course of time through the influence on public opinion produced by the strict personal precautions which the inmates are obliged to take, and which they communicate to others after they have returned to their homes. A vast improvement, however, has taken place throughout all parts of England and Wales over a long course of years, and it is impossible to ascribe this to Sanatoria.

It has, however, been recently put forward and argued at some length, and with a considerable production of statistics by Dr. Newsholme, that the continued reduction in the Phthisis death-rate of this country has owned as a predominant factor the treatment over long periods of cases of Phthisis in the Union Hospitals.

The death-rate from Phthisis has gone down for a period of 40 years

If this be true under the imperfect conditions of 30 years ago, we can do, and are doing much better now, and we could profitably do much more in the same direction, and, in fact, in any case there is a considerable number of cases at all times (not merely of the poorest) who ought to be treated in hospital, and the treatment of whom in hospital must remove infection from their homes and from the community.

Has isolation in Union Hospitals been the dominant factor in causing this reduction?

We have been acting on this supposition at Clayton Hospital for some years, and, in my opinion, we ought to have more accommodation for such cases, which we should, it may be hoped, know how to use for the reduction of infection. It is on this ground that the Sanitary Authority have obtained beds in the Crossley Sanatorium.

It is necessary to weigh carefully the opinion expressed by Dr. Newsholme, because it might lead to a placid trust in the influence of Union Hospitals which may be unjustified in the issue, and also because we may be induced by the endorsement of this view, if it is incorrect, to overlook cardinal factors in the improvement which has occurred, the recognition of which may guide us onward.

Your Medical Officer has been accustomed to consider the improvement which has occurred in this country as due in no small measure to the great expansion in our industrial and commercial prosperity, which began in the sixties, coupled with the sanitary legislation to which this expansion has given occasion, or by which, at all events, it has been accompanied.

First, then, as regards the effect of the Union Hospitals, Dr. Newsholme's case rests on what has occurred in England and Wales. Undoubtedly, a very large number of consumptives have been treated in the Union Hospitals from an early period, and one would imagine that a large reduction in the incidence of Phthisis must have occurred in consequence.

Causes reducing the natural effect of segregation in these hospitals

It is, however, needful to bear in mind that no inconsiderable section of these have received repeated treatment, and there is no reason to suppose that these persons have produced much less harm at home than they would have done had they not been in hospital. With regard to the remainder, it is doubtful whether they have not often acted as centres of infection. It is questionable whether very strict precautions in regard of the expectorations were taken until a recent period. Further, a large section of the phthisical persons came from common lodging-houses, where the fountain of infection was too copious to be much influenced by segregation, or from homes where infection was already present.

It is evident that an immense deduction must be made from the good that the Union Hospitals might have effected had the phthisical inmates been drawn from sanitary homes, and been made subject to modern rules.

I cannot accept the view that the great reduction in the Phthisis death-rate is due to segregation in the Union Hospitals as the dominant factor. No such result has followed in Ireland from the treatment of a large proportion of the poor in Union Hospitals.

The improvement in the Phthisis death-rate has been greatest at the younger periods of life, just as has been the improvement from other causes of death.

If segregation were the cause of the improvement in the Phthisis death-rate being greater than that in the total death-rate, this effect ought to have increased in recent years. The reverse has been the case. We gather from the Registrar-General's Annual Report for 1905 that from the quinquennium 1896–1900 to the

quinquennium 1901–1905 the Phthisis death-rate declined by 8·12 per cent., while the death-rate from all causes declined by 9·54 per cent. The shifting of the age distribution of the population enters largely into the relative total decline or increase from any source of disease in a given period.

Even from 1871–80 to 1881–90 while the Phthisis death-rate improved by 18·5 per cent. as compared with an improvement of 10·68 per cent. in the death-rate from all causes, and of 9·40 per cent. if Phthisis be excluded, it still remains that 9·40 per cent. out of the total improvement (10·68 per cent.) was due to other causes, most of them little likely to be influenced by segregation in Union Hospitals.

Segregation important, but not the dominant factor

If the three main divisions of Manchester be compared over a long series of years there is but little improvement in the Phthisis death-rate in the Manchester Township, the poorest area, in which segregation has been far the most largely employed. The Phthisis records enable us to see how far migration has had to do with the result, assuming that our determinations of the period of infection are accepted, and, in the result, if segregation in the Union Hospital exercised the profound influence with which it is credited, the Manchester Township ought to have shown a much greater reduction in its Phthisis death-rate than the other two divisions.

The reverse is the case. The amount of segregation is by far the least in North Manchester, yet it is in this division that the greatest reduction in the Phthisis death-rate has occurred.

It must be admitted that this is somewhat remarkable, and is contrary to what one would expect.

We are to remember, however, that there still remains, after the segregation of the larger number in the Central District, the same large proportion of susceptible material, the greater degree of aggregation in the centre of the City, and probably a much larger proportion of cases altogether overlooked.

Public-houses are more numerous. There is far more frequent movement from one dwelling to another, especially in the case of families poverty stricken through the presence of Phthisis.

There is, moreover, a by no means negligible element of imported Phthisis, in the presence of numerous phthisical persons living without the City, whose business requires their presence in the City during the day, and who infect their neighbours, and also the charwomen, porters, labourers, etc., who live in the City. This element of imported risk must, however, be small compared with that which arises from the high degree of susceptibility arising from insufficient nutriment, alcoholism, and from crowded and insanitary dwellings. Clearly the conclusion to be drawn is, not that the segregation of

so many of the poorest class," here and elsewhere, has been unproductive of benefit, but that, given a certain degree of poverty, dirt, and it may be crowding, segregation is unable to stem the tendency to an increase of Phthisis. If one may so put it, to each set of social conditions appertains a certain death-rate from Phthisis. These conditions are the most important elements, though, no doubt, segregation and instruction help, either by accelerating improvement or retarding decline.

ENGLAND AND WALES. ANNUAL DEATH-RATES AT TWELVE AGE PERIODS, AND AT ALL AGES, CORRECTED FOR AGE CONSTITUTION IN GROUPS OF YEARS.

Males.

Period	All Ages	0—	5—	10—	15—	20—
1851–1860...	21·9	72·7	8·5	4·9	6·7	8·8
1891–1900...	19·2	62·7	4·3	2·4	3·8	5·1

Period	25—	35—	45—	55—	65—	75—	85+
1851–1860...	9·6	12·5	18·9	31·0	65·5	146·7	308·2
1891–1900...	6·8	11·5	19·0	35·0	70·4	146·1	286·8

Females.

Period	All Ages	0—	5—	10—	15—	20—
1851–1860...	20·6	63·0	8·4	5·1	7·4	8·6
1891–1900...	17·0	52·8	4·4	2·6	3·7	4·5

Period	25—	35—	45—	55—	65—	75—	85+
1851–1860...	10·0	12·2	15·3	27·1	58·9	134·5	288·9
1891–1900...	6·1	9·6	14·8	28·5	60·7	130·6	261·4

It is worthy of mention that Dr. Wheatley, of Shropshire, has published an investigation into the incidence of Phthisis in Shropshire, from which he could not ascertain that the reduction of Phthisis is traceable to segregation in Union Hospitals in that county.

Now although one is confident that the reduction in the Phthisis death-rate in England and Wales does not own segregation in the Union Hospitals as its main factor, it is by no means easy to say how it has been brought about.

In order to form some idea of what have been the causes at work in reducing the death-rate from Phthisis throughout England and Wales, we must see how this reduction has proceeded.

Study of the course of Phthisis in England and Wales so far as shown by statistics

First of all, the death-rate from all causes has also undergone a great and continuous diminution. This can be seen by examination of Table 15 in the Report of the Registrar-General for 1905, from which it must suffice to quote the terminal sets of figures.

In the earlier as in the later periods males have the higher death-rate, but the total death-rates in females have been lowered to a greater extent than the total death-rates in males.

The greatest improvement for males as for females has taken place at ages 5–14, and with advancing age the lowering of the death-rate gradually fades away, becoming small or reversed at ages above 45.

Now this increased protection of females and children accompanies, and is, a sign of increasing prosperity in the classes amongst whom it occurs. When there is barely enough or not enough to go round the man is looked after at the expense of the others, as nothing could be more fatal than any failure in his strength. Boys will probably be better cared for than girls.

As circumstances improve, the younger members of the family share alike with their elders, and a marked improvement takes place both in their physique and in their resistance to disease. At the same time, more protection is accorded to women and girls.

If we examine the death-rates, we find that the first marked permanent fall in the death-rate occurs at the period 1876–80.

This is most conspicuous at all ages between 5 and 35. Not until the next quinquennium do we get a permanent drop in the death-rate at ages 0–5.

Now there can be no doubt about the great benefit of a country life to health.*

Thus, for example, in 1905, the male death-rate corrected for age constitution was for Lincolnshire 15 per 1,000, as compared with a corresponding rate for Lancashire of 19·8 per 1,000.

* Registrar-General's Annual Report for 1905, page 17.

If, however, we compare the death-rates at age groups, we find figures which arrest attention.

DEATH-RATES—MALES—AT TWELVE AGE PERIODS IN 1905.

	0—	5—	10—	15—	20—	25—
Lancashire	57·8	4·3	2·4	3·4	4·1	6·2
Lincolnshire	46·2	4·0	2·4	3·1	4·4	5·0

	35—	45—	55—	65—	75—	85×
Lancashire	11·4	21·6	42·8	86·0	161·4	344·4
Lincolnshire	7·9	12·5	25·1	60·7	138·9	297·9

Probable influence of nutrition

At the ages 5–24, the death-rates in these two counties approximate closely. It is not till a later period of life that the healthier life in the country is able to make its impress on the death-rate. Now there can be no question that children as well as adults enjoy benefit from living in the country, and they are assuredly less liable to fatal zymotic disease. The difference probably lies in this, that the average Lincolnshire child is not so well nourished as the average Lancashire child, and is not so well housed, in the sense, at least, that there is more crowding.

The same holds good generally, and not merely for these particular counties.

On page 19 of the same report is a table giving the crude death-rates for England and Wales in successive quinquennia from 1871–75 to 1901–05 from all causes, and from various causes.

Elements making up the items in which the general death-rate of England and Wales has improved

Of a total gain in the death-rate at the end of 30 years of 5,957·8 lives per million, no fewer than 2,180 are under the group of zymotic diseases comprising Smallpox, Measles, Scarlet Fever, Typhus Fever, Enteric Fever, Whooping Cough, Diphtheria, Croup, Diarrhœa, Dysentery, and Cholera; 1,002·8 are ascribed to Phthisis; and 748·4 come under Pneumonia and Bronchitis, these three heads making up 3,921·2 out of the total.

It is certain that the saving of life under the head of "zymotic disease" represents an immense diminution of lesions predisposing to Phthisis in persons who have been attacked and who have survived. Here, then, is one definite head under which we can allocate a high proportion of the reduction in the Phthisis death-rate, especially in towns.

Improvement under zymotic disease has entailed improvement in Phthisis

To this cause also must be ascribed the much greater reduction in the general death-rate of large towns as compared with rural districts. This is, however, by a long way not the whole matter. We may obtain further guidance by comparing the death-rates from Phthisis in town and country.

Turning to the Introduction to the Report of the Registrar-General for 1905, page xciv., we find a table showing the death-rates for males and females from Phthisis (*a*) in an urban group of counties containing 18 million inhabitants; (*c*) in a rural group of counties with a population exceeding four millions. In the urban counties the average male death-rate from Phthisis for the years 1900–04 was 1,644 per million, the female 1,088. In the rural counties the male death-rate was 1,236 per million, the female 1,027. The female death-rate did, thus, not differ appreciably in town and country. These facts again seem to point to the average home conditions being less favourable to health in the country than in the town, including in these conditions the food and clothing available. In the year 1905 the rural death-rate in females from Phthisis exceeded the urban death-rate. The lower degree of material prosperity, in fact, more than sufficed to balance the advantage of living in the country.

There is, however, an element peculiar to the country which may be taken to be specially favourable to the production of Phthisis, viz., the numerous marriages which occur between persons akin to each other. There can be no question that this exercises an injurious influence on physique, and that in this respect country districts are at a disadvantage compared with town dwellers.

We are in a position to pursue our inquiries somewhat further. If the mean death-rates from Phthisis for the years 1881–90 in males and females in each of the registration counties be calculated out for successive groups of ages, 10–14, 15–19, 20–24, 25–34, 35–44, 45–54, 55–64, from the figures given in the Decennial supplement of the Registrar-General in 1895, we find that the female Phthisis death-rates greatly exceed the male death-rates in all the districts at the ages 10–14, and to a less extent at ages 15–19. At higher ages they cease to do so in the urban counties, but continue to exceed the male death-rates up to a much later period of life in the rural counties. Not only so, but the female death-rate in rural counties at ages 10–14 decidedly exceeds the female death-rate in the urban counties at the same age. This is conspicuously the case for Rutlandshire, Lincolnshire, the East and North Riding, Westmorland, Cumberland, Cambridge, Suffolk, Norfolk, Devonshire. At ages 15–24 this is notable for Devon, Norfolk, Suffolk, Cambridge, Cumberland, Westmorland, North Riding, East Riding, Lincoln, Huntingdon, Berkshire.

Not only the female but also the male death-rate ascribed to Phthisis at these earlier ages in a number of counties exceeds that of London at the same ages, and it is open to question whether the rapid rise of Phthisis in London at ages 35–44 is not due largely to cases imported from the country. At all events, of this there is no doubt, that many rural districts have a higher Phthisis mortality at ages 10–14 than exists in the towns. This is not compatible with the explanation that young people from the country contract Phthisis in the towns and return to the country to die. The disease is produced in the country districts themselves, and is especially fatal to the young, probably because the average individual is not so well nourished as in the towns, the housing of the poorer classes is not so good, and the stock is weakened by intermarriage.

The male death-rate has declined much less than the female, and the death-rate at a ages than the death-rates of adolescents. These facts indicate the influence o prosperity

Moreover, the approximation of the female to the male death-rates, and the special severity of the disease on the young, is a token that the rural population is on a lower plane of material prosperity than the urban.

If, now, we refer to a table handed in by Dr. John Tatham to the Royal Commission appointed to inquire into the administrative procedures for controlling danger to man through the use as food of the meat and milk of tuberculous animals, and published in Part II. of the evidence, page 364, we find there the mean death-rates in registration counties per million living for persons, males and females, in the periods 1861–70 and 1881–90. In the interval the male Phthisis death-rate for the whole country declined by 25 per cent., the female Phthisis death-rate by 35 per cent. Now this decline was general, and a number of the rural counties showed a higher rate of decline than the urban counties. One may enumerate Berkshire, Norfolk, Shropshire, Derbyshire, Cumberland, and Westmorland.

The great decline of the zymotic death-rate does not account for this equality of descent. It is probable, however, that to some extent the decline in the rural districts is to be ascribed to the migration of adults into the towns, especially of those less fitted for arduous work.

In this way the age distribution of the country population is rendered less favourable to a high Phthisis death-rate at all ages.

In the main, however, the advance is probably due to a gradual increase in the general well-being. That this is the probable explanation follows from the much greater decline of the Phthisis death-rate among females than among males, and of young persons as compared with those more advanced in years.

In fact, as Dr. Tatham puts it, between 1851–60 and 1891–95, the adult mortality from Phthisis in males and females has been completely reversed, being in the first period considerably higher in females, in the latter considerably higher in males.

How the industrial expansion may be supposed to have improved rural districts

We may now endeavour to form some idea of the forces which caused the great reduction of the death-rate from Phthisis from 1861–70 to 1881–90. In the former years began the great industrial expansion which drew off large numbers of young adults of both sexes from the rural districts. The construction and manning of railways was now in full swing. A great increase of intercourse and movement was in progress. The result was, no doubt, that the serious overcrowding of cottages was greatly reduced. In proportion to the persons to be clothed and fed, the resources of agricultural households were augmented. Probably, also, the members of agricultural families who did well in the towns or on railways assisted those who remained at home. Personal adornment began to be possible, and the result would be a great increase of cleanliness in the home. Dissatisfaction with the old thatched cottages grew, and the conditions of housing were gradually improved. By-and-by wages increased. Food became much cheaper, and then more varied. Clothes also cost less. With increased facilities of movement intermarriage diminished. As elementary education became more general, less physical drudgery was imposed on young people, and women more and more ceased to take part in field labour. The agricultural population shared, no doubt, to a larger extent than at first sight would appear to have been the case in the general prosperity of the country.

Its effect on towns

As regards the towns, however, the first effect of the increased influx would be to add to the evils already existing, and the increased overcrowding, no doubt, helped to force on sanitary improvements. The outbreak of Cholera in 1865–66 doubtless, also, assisted the labours of the many earnest sanitary reformers who were endeavouring to secure a sanitary code and administration. A general sanitary administration was made compulsory by the Public Health Act, 1875, though, doubtless, great efforts were made before that period to reduce the filth which prevailed. Great, however, as are the benefits accruing from this, and from previous and subsequent Acts, they can scarcely be supposed to have determined the general improvement in the Phthisis death-rate at the period in question, which must to a large extent be ascribed to the increased resistance to disease resulting from a general advance in nutrition.

Again, while the country obtained relief by the opening of labour markets, the towns derived immense benefit from the influx of healthy persons inured to labour, and of good personal habits. The stock in the towns was reinvigorated, and the average physique improved. A double good was thus conferred by the industrial expansion on town and country alike.

It is probable that the great fall in the Phthisis death-rate which has occurred in Germany in recent years has been produced in a similar manner.

The great foe of Phthisis has been the stir and movement of successful enterprise, guided by advancing sanitary science. The cry is now "Back to the land," and if that should be proved a possibility, it will be attended for a time by a still further diminution in Phthisis, provided the new settlers are housed in a thoroughly sanitary manner, under good building bye-laws strictly enforced. In turn, the expansion of towns will be attended by a still further reduction under the same condition, owing to the improvement in rural health.

The most potent aid to sanitary reform is the gradual advance of wages among the labouring classes, especially if they obtain the full advantage of this advance through education, thrift, good houses, and cleaner conditions of life.

Other factors

Then, again, a factor of no mean order in the diminution of Phthisis has been the long continued effort to provide for the protection of children and women, and by consequence also of men, working in factories, starting from the period of the Royal Commission of 1862 to 1866. In more recent years considerable progress also has been made in respect of ventilation, both general and localised, where injurious dust has been removed in special processes by special means.

The effects of this legislation would be confined to industrial districts, however, and could scarcely be supposed to affect rural areas, except very indirectly.

In recent years the Elementary Schools have exercised an increasing influence towards cleanliness, but it is very doubtful whether in the past this was a factor of great moment.

The advance of surgery has, no doubt, served to reduce the quantity of infection in circulation; but this, also, cannot be supposed largely to have affected the result.

The factors which appear to emerge are these :—

Two evident causes of the decline

1. A great advance in the material well-being of the working classes extending over the whole country, and producing increased resistance to disease. This advance has entailed cheaper, more varied, and more abundant food and clothing, better conditions of housing, greater cleanliness, and a larger proportion of the population enjoying these advantages.

2. A sustained effort to improve sanitary conditions, with a consequent great reduction in zymotic disease, whereby the numbers suffering from lesions predisposing to the reception of Phthisis have greatly diminished.

If, however, increased resistance to disease has been so important a factor in the reduction of Phthisis, it becomes needful to consider how far it is a necessary part of the contest against Phthisis in individual families. It may be that a greater effect can be produced by general action calculated to improve the

physique all round ; but the most direct route to oppose the advance of Phthisis would seem to be through the improved health of those directly exposed to infection. To this subject we shall return.

Report on the International Congress on Tuberculosis, held at Paris in 1906

It may here be mentioned, however, that two delegates were appointed by the Local Government Board to the International Congress on Tuberculosis, held in Paris in 1906, viz., Dr. Theodore Williams and Dr. Bulstrode, who have presented a report on the more essential features of the Congress.

The view, it seems, has been growing in France that Tuberculosis is contracted chiefly in childhood, and that the appearance of Phthisis in after years marks merely recrudescence of the disease which has been lying dormant in the system. If, then, children with a tendency or supposed tendency to Phthisis could be specially tended in some healthy place, their resistance to the disease being thereby sufficiently increased, they might be expected to escape Phthisis altogether.

Marine sanatoria and pre-tuberculous children

There have thus sprung up in France a number of seaside sanatoria to which children are sent to be strengthened against the assaults of the tubercle bacillus.

Such a movement on so great a scale is likely to be productive of much good.

In my opinion, however, the basis of this action, if I understand it aright, is not altogether a safe one.

Adult Phthisis in the main due to adult infection

The observations of Cornet on the wholesale infection of the novices in Catholic Nursing Institutions in Prussia appear to me to have clearly shown that adults are to a very large extent invaded effectively by the disease for the first time. The former experiences of troops in English and French barracks show the same thing. It is, moreover, our experience that such infection does frequently occur in adults who have never shown any previous sign of disease. The late Dr. Harris collected particulars, and made observations, showing that a very high percentage of persons dying of other diseases, when autopsied, revealed healed tubercular lesions. This is not to be taken as a proof that such persons were liable to a recrudescence of the disease. On the contrary, it may be presumed that they enjoyed some protective immunity against Phthisis.

There can, in fact, be little doubt that many of those persons who, after intense exposure to infection in adult life, have contracted Phthisis, but who showed signs of Tuberculosis in earlier years, have been reinfected, and have not derived their last attack from previous illness.

The trend of French opinion being what it is, it is a source of much satisfaction to find that Dr. Calmette does not adopt the view that Phthisis is a disease of childhood.

This contention, in my belief, is baseless, though, of course, one does not dispute that not a few cases are of this lingering type. They are, however, the exceptions not the rule, and action founded on this hypothesis to the exclusion of adult infection can only lead to disappointment.

German speakers at the same Congress believed that the German system of state-aided insurance with workmen's sanatoria as its auxiliaries is largely responsible for the decline in the German Phthisis death-rate, though this opinion was strongly contested. This contention is, however, probably correct. The German system of insurance, which makes provision for the maintenance of the family for a time, must act as a strong incentive to working-men to lose no time in making sure, if they suspect the onset of Tuberculosis, and in taking steps at once to have the disease treated in hospital or elsewhere, and otherwise to get advice. This is a great gain It may be necessary for us to find some equally strong incentive to workers to seek the necessary medical assistance on the first suspicion of Phthisis, or even on the chance of Tuberculosis having taken hold of the system, and so to obtain early instruction in preventive measures.

Report of the Royal Commission on Tuberculosis

The outlook of local authorities on the administrative action requisite for dealing effectively with the prevention of Tuberculosis in man must necessarily be influenced by the Second Interim Report of the Royal Commission on Tuberculosis recently issued. The Commission was issued in 1901 to inquire and report with respect to Tuberculosis :

(1) Whether the disease in animals and man is one and the same.

(2) Whether animals and man can be reciprocally infected with it.

(3) Under what conditions, if at all, the transmission of the disease from animals to man takes place, and what are the circumstances favourable or unfavourable to such transmission.

In this Interim Report it is proposed to deal only with the inter-communicability of bovine and human Tuberculosis, although, incidentally, considerable light is thrown on the relations of the disease as it occurs in other animals.

The report concerns itself, also, only with experimental evidence. The experiments were conducted on two farms placed at the service of the Commission by the generosity of Sir James Blyth, the experiments with tuberculous matter of bovine origin being conducted only on one farm, those made with tuberculous matter of human origin being confined to the other.

The most scrupulous care was taken to exclude sources of experimental error, and we are made to feel that the experimental work is to be depended upon.

It was considered necessary to compare with the effects of the experimental introduction into bovines of tuberculous matter of human origin, introduction under similar conditions of materials of bovine origin.

The bovine tuberculous matter was derived from 30 cases of Tuberculosis occurring naturally in the ox. The tubercle bacillus was introduced into the body of the experimental animals either in the form of an emulsion of tuberculous lesions or of a culture grown in artificial media and suspended in innocuous fluid. The experimental animals were for the most part Jersey calves, which are known to be remarkably free from Tuberculosis, although, in addition, their freedom from natural Tuberculosis was assured by means of the tuberculin test.

The materials were introduced (1) by feeding; (2) by injection into the tissues. In a few instances they were, for special reasons, introduced into veins, and in others injected into the lacteal ducts of the udders of cows intended for experimental feeding.

The inoculations were made in the neck of the calf.

The quantities of culture used were large, viz., 50 milligrammes, such an amount containing between 200,000 and 250,000 million bacilli, although for comparison smaller doses were used in certain instances.

It was found that, in proportion to the dose of bacilli, emulsions of tuberculous matter were far more potent than cultures.

When these doses are injected into the necks of calves there is a speedy reaction at the seat of injection, with the occurrence of swelling. In a few days the prescapular gland, and then the presternal gland, are enlarged, and about the twelfth day the animal begins to show signs of illness. Within twenty to fifty days the calf dies, or is so ill that it has to be killed.

At the seat of the inoculation is a mass of caseous tubercle, infiltrating the adjoining skin and muscles. The prescapular and prepectoral glands are a mass of caseous tubercle, and many other glands are also caseous, various organs being found studded with tubercles.

The animal dies of progressive Tuberculosis.

The disease is retrogressive if the animal is not ill, or if, after a passing illness, it recovers and puts on flesh. In such a case, when it is killed, the lesion at the seat of injection is found surrounded with a zone of dense fibrous tissue, the caseous matter there, and in the glands affected, has become calcareous, and the disseminated tubercles, if any, have disappeared. The degree of infection may have varied considerably. The disease may have invaded a number of glands and tissues, or a few, or only the prescapular gland, or may have been confined to the seat of inoculation, or, finally, no trace may remain.

Further, although the disease may not be progressing, tubercle bacilli may be found alive in some tissues, with a potency perhaps of recrudescence.

Within a day or two of the injection of doses of 50 mgrs. of bovine tubercle bacilli culture, bacilli are to be found in the general circulation.

Twenty cultures of bovine origin were injected in doses of 50 mgrms., and of these 18 always led to progressive general Tuberculosis.

In the case of 5 out of the 20 viruses, doses of 10 mgrs. instead of 50 were used ; the result was, in the case of each virus, though not of each animal, a generalised progressive Tuberculosis. When, in two instances, doses of 0·02 mgrs. and of 0·01 mgrs. were used, the result was in each case a limited retrogressive Tuberculosis.

The result depends, then, on the magnitude of the dose. But it also depends on the susceptibility of the animal, striking differences being observed from injection into different calves of equal doses of the same material.

The introduction into the udders of cows of tuberculous material of bovine origin produces tuberculous mammitis, which may not spread to the rest of the body, but may be fatal without such extension, or may extend with fatal result, or may end in recovery.

Six calves were allowed to suck the udders of six cows rendered tuberculous by injection for varying periods, and were killed at intervals of 74 to 363 days. In only one was general progressive Tuberculosis produced. In the others the Tuberculosis was for the most part limited to the intestines and mesenteric glands, and was retrogressive in character.

Fourteen other calves were fed with tuberculous milk from two sources, six from one, eight from another, the experiments taking from 36 to 127 days.

All showed limited retrogressive tuberculous lesions.

It would thus appear that bovine Tuberculosis is communicated to the calf by the ingestion of tuberculous milk with considerable difficulty.

Bovine Tubuculosis in its severest form communicable to a variety of animals, and by feeding to guinea-pigs, pigs, rabbits, monkeys, and anthropoid apes

Generalised progressive Tuberculosis was found to be readily communicable by inoculation of bovine tuberculous matters to pigs, goats, monkeys, rabbits, and guinea-pigs. In the case of goats the Tuberculosis was not fatal with comparatively small doses ; while in the case of the pig a very small dose sufficed to produce progressive generalised Tuberculosis.

Pigs were readily made tuberculous by feeding. This was also the case with guinea-pigs, and, though less readily, with rabbits.

In goats, a generalised progressive Tuberculosis was produced in one out of eight experimental animals.

Generalised progressive Tuberculosis was produced in Rhesus monkeys, baboons, and lemurs by feeding, whether with milk or culture.

Four chimpanzees fed, two of them with tuberculous milk, the other two with cultures of bacilli, in comparatively small doses, developed generalised progressive Tuberculosis

The cases of human Tuberculosis from which experimental material was derived numbered sixty.

These cases are divisible into three groups.

Human Tuberculosis communicable to the ox

In group 1, the effects produced on the experimental calves were similar to those produced by the materials from cattle affected with natural Tuberculosis. These numbered 14. In thirteen of these the primary affection was of the intestinal tract, and all the cases were children.

In group 2, numbering 40, the lesions produced by inoculation were limited and retrogressive.

Group 3 comprises six cases divided into two sets. Of the six, one is excluded from consideration, for reasons given.

In two, the virulence of the material was intermediate between that of group 1 and that of group 2.

In four, the material which at first appeared to place the cases yielding it in group 2 became virulent after transmission through calves. One of these, however, for reasons given, is rejected from discussion.

A study of the cultures derived from these different sources on various media permitted them to be divided into five different grades, according as they grew with greater ease and luxuriance (eugonic) or more scantily and with greater difficulty (dysgonic).

Children proved in 14 cases to have contracted a disease identical with bovine Tuberculosis, and by food

All the cultures of bovine origin fall within the most dysgonic grades 1, 2, and 3, as do also the cultures derived from the 14 cases of human Tuberculosis, injection of which produced generalised progressive Tuberculosis in the calf. In the eugonic grades 4 and 5 fall all cultures from the 40 cases of human Tuberculosis from which only retrogressive lesions were produced.

Now, not only do the materials from these 40 cases fail to produce Tuberculosis in calves, but the full dose of 50 mgr. of culture, when injected into rabbits, pigs, and goats, also failed to produce anything beyond a limited retrogressive Tuberculosis, although the disease was thus readily produced in monkeys and in the anthropoid ape.

The Commissioners conclude that the 14 cases in group 1 were, in reality, cases of bovine Tuberculosis occuring in man.

It thus appears that bovine Tuberculosis is communicable to man, and, reciprocally, that human Tuberculosis is communicable to the ox.

This does not affect the question whether human and bovine Tuberculosis are one and the same, which, for the present, is left undetermined. Nor does it appear necessary to enter upon this subject, or to do more than quote the observations of the Commissioners on the results at which they have arrived:

Summary by the Commission

"There can be no doubt but that in a certain number of cases the Tuberculosis "occurring in the human subject, especially in children, is the direct result "of the introduction into the human body of the bacillus of bovine Tuberculosis; "and there can also be no doubt that in the majority, at least, of these cases, "the bacillus is introduced through cow's milk. Cow's milk containing bovine "tubercle bacilli is clearly a cause of Tuberculosis, and of fatal Tuberculosis "in man.

"Of the 60 cases of human Tuberculosis investigated by us, 14 of the viruses "belonged to group 1, that is to say, contained the bovine bacillus.

"If instead of taking all these 60 cases, we confine ourselves to cases of "Tuberculosis in which the bacilli were apparently introduced into the body "by way of the alimentary canal, the proportion of group 1 becomes very "much larger. Of the total 60 cases investigated by us, 28 possessed clinical "histories, indicating that in them the bacillus was introduced through the "alimentary canal. Of these, 13 belonged to group 1. Of 9 cases in "which cervical glands were investigated by us, 3, and of 19 cases in which "the lesions of abdominal Tuberculosis were studied by us, 10 belonged to "group 1.

"These facts indicate that a very large proportion of Tuberculosis contracted "by ingestion is due to tubercle bacilli of bovine source.

"A very considerable amount of disease and of loss of life, especially among "the young, must be attributed to the consumption of cow's milk containing "tubercle bacilli. The presence of tubercle bacilli can be detected, though "with some difficulty, if the proper means be adopted, and such milk ought "never to be used as food. There is far less difficulty in recognising clinically "that a cow is distinctly suffering from Tuberculosis, in which case she may be "yielding tuberculous milk. The milk coming from such a cow ought not to "form part of human food, and indeed ought not to be used for food at all. "Our results clearly point to the necessity of measures more stringent than "those at present enforced being taken to prevent the sale or the consumption "of such milk."

These statements may be regarded as equivalent to a declaration that the facts ascertained call for the eradication of bovine Tuberculosis. This position Professor Delépine assumed some ten years back, at the same time indicating the means to be adopted. Professor Bang, also, had previously developed a plan by which the result may be attained with the least sacrifice possible. No doubt the practical working out of this proposal in such a manner as to

maintain a sufficient dairy stock, to prevent extensive fraud, to distribute the incidence of losses fairly, to effect the object thoroughly, and to do so at as little cost as may be, is a problem which will require both time and wisdom to solve.

There can be no doubt that the course of the Tuberculosis produced in calves by the inoculation of the very large doses of tubercle bacilli employed by the Commissioners does not represent the normal course of the disease in the bovine, however useful may be the method employed for bringing out the differences between the disease in man and the ox.

The disease in that animal, as a rule, advances slowly, and it may be open to doubt, therefore, whether the retrogressive lesions found in the abdominal organs of 19 out of the 20 calves employed in feeding experiments represented the final stage.

Certain it is that primary abdominal Tuberculosis is much more frequent in heifers than it is in old cows. Frequently in the latter it is impossible to arrive at a probable conclusion as to the initial lesion, though sometimes there is reason to believe that infection has entered the system by way of the intestine.

Having regard to the comparative frequency of abdominal disease in heifers, we are obliged to conclude either that feeding with milk, as in the experiments carried out by the Commission, is not favourable to the development of Tuberculosis by way of the intestine, or that the lesions produced by feeding with tuberculous milk develop more frequently at some future period than their results would appear to indicate. It may be that abdominal infection in the heifer is produced largely by licking tuberculous matter off older animals or by the swallowing of inhaled tuberculous dust.

Abdominal Tuberculosis relatively frequent in children, and also in young animals

We have seen that about a fourth of the deaths ascribed to Tuberculosis in man are put down to forms other than the pulmonary. These are mostly in young persons, and are probably due, almost entirely, to abdominal infection. The numbers may be considerably exaggerated. At all events, a high proportion of these deaths occur during the first year or two of life. Post-mortem records, however, do not support the sudden increase of deaths ascribed to tabes mesenterica after the first three months, but show rather that, like calves, children are, with rare exceptions, born free from Tuberculosis, the number of deaths increasing slowly and gradually month by month, and year by year. Nevertheless, with children as with calves and heifers, a primary abdominal Tuberculosis is far more in evidence than it is in later years.

It is usually believed that this is due to the far greater extent to which infection in later years is contracted by inhalation, and by consequent invasion of the respiratory tract.

Von Behring's view that Phthisis is implanted in childhood, and is due chiefly to ingestion of cow's milk

In 1903 and 1904, Von Behring put forward the view that infection is practically entirely abdominal, is due to ingestion of tuberculous milk, and occurs in young children, the disease extending to the lungs in later years.

This teaching is certainly in conflict both with observation and experience, so far as the statement that Tuberculosis in the adult dates from childhood is concerned, but the contention that the infection of Tuberculosis enters the system only by the intestinal tract is one which requires to be considered.

The accepted view that the bacillus enters the system chiefly by the respiratory tract has, perhaps, been rather accepted than proved. Those experiments in which animals have been subjected to a spray of suspended culture of the tubercle bacillus, and have contracted pulmonary Tuberculosis, are susceptible of another explanation.

It may be contended that the bacilli are swept back from the bronchi into the œsophagus, and are then swallowed, and make their way into the lungs after penetrating the intestine and finding their way into the lymph stream.

Calmette and Guerin's experiments tending to the view that Phthisis is more frequently due to alimentary than to respiratory infection

This, in fact, is the view strongly held by Calmette and Guerin, who expound their views and advance experimental evidence in their support in three memoirs published in the Annales de l'Institut Pasteur.

Their experiments were, for the most part, made with goats and kids, although they also used bovines. The materials introduced into the experimental animals were derived from man, the ox, and birds, and included also cultures of the bacilli of timothy grass.

Definite doses of cultures—viz.: ·02 grammes of cultures of the different tubercle bacilli were introduced into the ducts of the udder of goats in a condition of gestation.

This dose of bovine tubercle bacilli produced rapid tuberculisation of the organ, which in the course of 4 or 5 days becomes enormous, hard, lumpy, and painful. One goat dropped its young the day after infection, and died on the 43rd day. Another dropped its kid on the 8th day, and died on the 57th. All died within 60 days with symptoms of intense intoxication. No lesions were discoverable otherwise than in the udder.

The same dose of human bacilli produced inflammatory phenomena much less grave.

The glands slowly enlarged, and became sometimes very large and painful. At the end of 20 or 30 days they gradually softened, the lacteal secretion became re-established, and presently the udders diminished in volume. After three months the animals still reacted to tuberculin and the milk still contained tubercle bacilli, but the glands had regained their normal size.

Avian bacilli in this dose produced no effect. After a dose of ·25 grm., however, the udders took on the same appearance as after injection of the smaller dose of human bacilli. Lactation remained normal. The bacilli were demonstrable up to the 23rd day.

The bacillus of timothy grass was injected in a dose of 0·70 grm. and produced no apparent effect, though bacilli were demonstrable up to the 18th day. The animal tested with tuberculin after 60 days did not react.

Feeding experiments were conducted partly on the kids dropped by these mothers, partly on kids from healthy goats fed with cultures by means of an œsophageal tube of such length as to terminate just short of the cardiac orifice of the stomach.

These will be given in a very abridged form:

1. Two kids were fed by the mothers whose teats had been injected with bovine tubercle bacilli.

One kid, killed at the end of 45 days, showed general adenopathy of the glands connected with the stomach and intestines. These glands were crammed with tubercle bacilli. Other more distant glands and the lungs were unaffected. The other kid was killed at the end of 51 days. The glands were as in the first kid. But in this instance the lungs were studded with tubercles.

Both kids were ailing, and their development was checked.

2. Two kids fed by the mothers whose udders had been injected with human bacilli.

One was killed at the end of 45 days. The mesenteric glands were large and hard; contained calcareous matter surrounded by fibrous tissue, and some tubercles containing a few bacilli. Emulsion of a gland inoculated into two guinea-pigs produced no effect.

The second kid was killed at the end of 112 days, having remained ailing and ill-developed. The appearances were as before, except that some glands had softened. The contents injected into two guinea-pigs produced no effect.

The results of the feeding with avian tubercle bacilli and with the bacilli of timothy grass are interesting, but may here be omitted.

Feeding with Cultures of Tubercle Baccilli.

The cultures suspended in emulsion were introduced into the stomach by an œsophageal tube. Three kids had fresh cultures of bovine bacilli, two on four successive days, the other on two successive days, the doses being ·05 grms. When killed, their mesenteric ganglia in all were found to be tuberculosed.

In two, the lungs were thickly studded with tubercles, and the bronchial glands were also much affected.

Two kids similarly fed with tubercle bacilli of human origin remained healthy.

Subsequently fed on bovine bacilli they presently lost flesh, and, when killed, showed lesions of the mesenteric glands, and tubercular deposits in the lungs. In one case the peribronchial and mediastinal glands were enormous, in the other normal.

A similar result was obtained in one kid fed on avian bacilli, and subsequently on bovine bacilli.

The bovine tubercle bacilli employed in these experiments were thus considerably more virulent to goats than the human tubercle bacilli.

It would also seem that emulsion of cultures in sterilised water is more virulent when fed to goats than bacilli produced by the udder, and contained in milk.

The authors then record experiments on the pulmonary tuberculisation of adult goats by ingestion of tuberculous products.

In their view, when a dose of tubercle bacilli is fed to an adult animal it gets into the general circulation more readily and abundantly than when given to a young animal. They explain that in the young animal the interior of the lymphatic glands is packed tight with cells, while in the adult there are considerable spaces left unoccupied by the side of the trabeculae and in the hilus of the gland. The bacilli can in their view readily pass by these spaces in the adult, and so reach the circulation.

They consider that to get uniform results cultures should be triturated in a mortar with sterilised liquid, and so made into an emulsion, which is then to be fed by small successive doses through an œsophageal tube. When so fed, each successive bolus is passed into the œsophageal groove, so escaping the rumen, and reaches the fourth stomach.

Three illustrative experiments are given showing that when three adult goats were fed on four successive days with ·01 grm. of culture of bovine bacilli, and killed after 65, 50, and 50 days respectively, the lungs in each of the three were invaded by tubercle, the invasion of the lungs in the first instance being general and complete.

The authors conclude that the adult animal contracts Tuberculosis easily by ingestion of virulent bacilli disseminated in liquid, the tubercle bacilli rapidly finding their way to the lungs, and there producing pulmonary Tuberculosis.

The discharges from these lesions are carried up into the œsophagus and swallowed, the bacilli again enter the lymph circulation, reach the right side of the heart, and are carried into the lungs. In this way they explain the different stages at which tubercular deposits occur in the lungs.

The reason why the abdominal origin of these pulmonary invasions in older animals is overlooked would, in their view, be that the effect on the lymphatic glands is little noticeable, as the cells containing bacilli have little difficulty in passing through the mesenteric glands. No doubt changes occur in the glands, but they are much less conspicuous than in young animals.

A record is given of feeding experiments made on four cows to which were administered small single doses of cultures of tubercle bacilli emulsified, and fed in the manner already mentioned.

These cows were tested with tuberculin on the 30th day, and all reacted strongly. Killed at varying periods, only one, the last killed, gave evidence of tuberculous deposit in the lungs.

It was proved, however, by inoculation of material in guinea-pigs, that in all four the disease had lodged in the lung at a comparatively early period.

Further experiments with calves established that these animals are infected in the lungs by feeding with small doses of bovine tubercle bacilli suitably administered.

The authors consider that their views are strongly supported by experiments made by P. Vansteenburghe and Grysez, at the request of M. Calmette, on the production of anthracosis, familiarly known as Coalminer's lung. These authors find that if an adult guinea pig be fed with china ink or lamp black, in 24 to 48 hours blackish islands are scattered over the upper lobes of the lungs and along the border of the inferior lobes. The mesenteric glands are free, while those of the mediastinum are black.

The infiltration of the lungs is intraparenchymatous, showing that the colour is due to materials carried to the lungs in the blood vessels.

With young guinea-pigs the results are entirely different. In these the lungs are free, while the mesenteric glands are infiltrated with black particles. On plugging the œsophagus of rabbits, and causing the animals to breathe a smoky atmosphere, they found that in these animals the lung remains unaffected.

They conclude from these and other observations that infection is introduced by the alimentary canal, and not by the lungs. They do not dispute, however, that if lesions exist in the upper respiratory tract, tubercle bacilli are liable to be implanted and to grow on the site of these lesions. Even then, the invasion of the lungs would, in their view, take place by way of the circulation, and not by direct conveyance of tubercle bacilli into the air cells. If, however, the frequency of the occasions be considered on which the laryngeal and bronchial mucous membrane is injured from one cause or another, the deduction thereby implied from the thesis that infection is by the alimentary tract must be regarded as considerable.

At the same time, these investigations, which cannot be given here at greater length, do show that tubercle bacilli pass through the intestine with great ease, and do readily find their way to the lungs and to other parts of the system. They cannot be taken as disproving frequent infection by the air passages, but they certainly direct attention forcibly to the great risk of abdominal infection.

While it cannot be said that the results of these experiments directly conflict with those of the Royal Commission, there is general disagreement in one or two important particulars.

One of these is the very favourable termination to the feeding experiments with calves obtained by the Commission.

The element of time is here of much consequence. The calves used in their feeding experiments by the Royal Commission were killed at a comparatively late period, when the changes produced had been allowed to run their full course. Something, however, may be put down to the score of method of feeding. In the experiments of the Commission the tubercle bacilli were ingested in milk, and it is possible that in this form they are less dangerous than when given in aqueous emulsion of bacilli.

The importance of the time element is emphasised by Calmette and Guerin's series of feeding experiments with calves, in which they were led to the conclusion that tubercle bacilli may be implanted in the lungs, may there produce pathological changes, and may be recoverable from them if the calves are killed early after the experiment, say at the end of 30 days; while in calves kept for 60 days, and then killed, it may be impossible to find any trace of disease in the lungs, though the bronchial glands are infected.

It is open to us to infer that the changes were, at the corresponding periods, the same in the lungs of the three calves killed at the earlier and in those of the three killed at the later period, and that before the 60 days had elapsed, bacilli, introduced by a single feeding dose, had invaded the lungs, and had been in turn removed from them.

The production of changes in the experimental animal at an early stage after the introduction of infection can be used, therefore, to indicate only modes of distribution of infection and risks, not certain results.

Calmette and Guerin, as the result of their observations, enunciate the broad principle that fatal results ensue upon repeated feedings with moderate doses of bacilli, but not after single doses. It is difficult to reconcile this with the results of the Royal Commission on the feeding of calves, and it is, no doubt, too absolute a statement.

These observations emphasise, however, no less conclusively than do those of the Royal Commission, the necessity of attending closely to all that concerns the feeding of both young and old people, especially with food derived from animals liable to suffer from Tuberculosis, and in households into which Tuberculosis in any form has effected an entrance.

More attention should be given to the introduction of infection by the alimentary canal

Part II.—Local.

The death-rates from Phthisis for the whole City have been already discussed under General Vital Statistics. We have seen that the death-rates from Phthisis have undergone a decrease in recent years, greater in North than in South Manchester, and greater in South Manchester than in the Manchester Township. These reductions have not been so great as those which have taken place in the general death-rates from all causes.

The reduction in the death-rates from forms of Tuberculosis other than Phthisis over a long course of years has been greater than that occurring under Phthisis. One has been inclined to ascribe part of the recent reduction of the Phthisis death-rate to the work done here in connection with the voluntary notification of Phthisis, more particularly because the fall in the death-rate has occurred at a period when the effects of this work should be especially manifest. But there are clearly other favourable factors in operation, of which by far the most important is the general advance in the wages of the labouring class.

This occurred, as I am informed, in 1901 and 1902, and so long as the advantage achieved is not wasted on drink or deleterious pleasure, it is bound to tell on the health of the population.

In order that we may see in more detail than hitherto the distribution of Phthisis mortality, a table has been prepared showing the mean death-rate from this form of Tuberculosis in each sanitary district for the ten years 1891–1900, and the death-rates in each year since 1901.

It is, perhaps, not advisable to place too much reliance on any one figure, the uncertainties always introduced, after a few years, into the estimates of the population of individual districts forbidding any degree of confidence in the accuracy of the figures.

The death-rate from Phthisis, however, shows an improvement in the last four years in nearly every district other than the Central, in which the death-rate has altered decidedly for the worse.

Nor can this be ascribed to underestimate of population, since the birth-rate has not declined to a greater extent than in Ancoats and St. George's.

No doubt the population is gradually becoming older, but that is the case all over the City.

Whether there is an increase in the number of persons coming to the City to qualify for admission into Crumpsall Hospital there are no means of stating without an extensive investigation. But this is certainly a possibility which has to be considered.

No improvement is shown in the districts of Blackley in North Manchester, or Ardwick in South Manchester. As regards Blackley, this may almost certainly be ascribed to underestimation of the population.

In Rusholme, again, the increase in 1901 and 1902 was undoubtedly due, in the main, to underestimate of the population.

The course of the death-rate in the main divisions of the City, and in each sanitary district, for the period 1891–1900, and in recent years, is shown in the subjoined table.

It would, assuredly, be of great advantage if we had an accurate measure of improvement or the reverse in each district. But this can only be obtained at sufficiently short intervals by the establishment of a quinquennial census, which is needed also for many other besides sanitary purposes.

Death-rates from Phthisis.

Statistical Divisions	Mean Death-rate 1891-1900	1901	1902	1903	1904	1905	Average 1901-1905	1906
City of Manchester	2·08	2·09	2·08	1·85	1·98	(1·68) 1·56	1·94	(1·81) 1·71
I. Manchester Township	3·22	3·49	3·54	3·00	3·14	3·00	3·23	2·99
II. North Manchester	1·26	1·21	1·26	1·05	1·23	0·96 (1·53)	1·15	1·03 (1·79)
III. South Manchester	1·90	1·93	1·86	1·79	1·90	1·33	1·80	1·59
I. Ancoats	2·67	2·82	3·17	2·43	2·26	2·78	2·69	2·48
I. Central	3·70	4·43	4·34	3·68	4·35	3·58	4·10	4·28
I. St. George's	3·37	3·52	3·42	3·09	3·23	2·89	3·23	2·79
II. Cheetham	1·16	0·99	1·05	0·80	1·11	0·87	0·96	0·78
II. Crumpsall	1·03	1·02	0·45	0·99	0·44	0·43	0·67	0·65
II. Blackley	1·18	2·14	1·33	0·98	1·61	1·59	1·53	0·94
II. Harpurhey	1·21	1·01	1·49	1·50	0·69	0·65	1·07	1·24
II. Moston	0·89	1·07	1·22	0·63	1·17	1·08	1·03	0·72
II. Newton	1·51	1·46	1·29	1·27	0·80	0·79	1·13	1·19
II. Bradford	1·35	1·18	1·62	1·23	1·30	1·29	1·32	1·40
II. Beswick	1·30	1·37	1·27	1·08	1·57	1·31	1·32	1·37
II. Clayton	1·02	0·72	1·33	0·71	0·94	0·95	0·73	0·72
III. Ardwick	1·67	1·54	1·62	1·62	1·78	0·98	1·51	1·81
III. Openshaw	1·25	1·24	1·16	1·33	1·35	1·06	1·23	0·80
III. West Gorton	1·65	1·43	1·61	1·58	1·53	1·38	1·51	1·65
III. Rusholme and Kirk.	1·10	1·61	1·82	1·10	1·00	1·00	1·31	1·18
III. Chorlton-upon-Medlock	2·09	2·38	1·85	1·76	2·47	1·90	2·07	2·18
III. Hulme	2·39	2·36	2·44	2·50	2·26	2·07	2·33	2·19
III. Moss Side	..	..	..	..	..	0·75	..	1·00
III. Withington	..	..	..	..	..	0·50	..	0·84

I have constructed a similar table for Tubercular disease other than Phthisis.

DEATH-RATES FROM TUBERCULAR DISEASES OTHER THAN PHTHISIS.

STATISTICAL DIVISIONS	Mean Death-rate 1871-1900	1901	1902	1903	1904	1905	Average 1901-1905	1906
City of Manchester	**0·90**	**0·78**	**0·71**	**0·76**	**0·69**	**0.56**	**0·76**	**0·61**
I. Manchester Township	0·99	1·14	0·89	0·95	0·79	0·69	0·89	0·87
II. North Manchester	0·60	0·42	0·47	0·41	0·41	0·42	0·43	0·37
III. South Manchester	1·03	0·82	0·77	0·90	0·82	0·58	0·78	0·65
I. Ancoats	1·03	1·44	0·98	0·92	0·91	0·82	1·01	0·99
I. Central	1·03	0·97	0·89	0·70	0·54	0·59	0·74	0·95
I. St. George's	0·95	1·02	0·84	1·11	0·85	0·65	0·89	0·74
II. Cheetham	0·41	0·27	0·37	0·26	0·35	0·37	0·33	0·22
II. Crumpsall	0·60	0·23	0·34	0·33	0·22	0·11	0·25	0·22
II. Blackley	0·73	0·34	0·00	0·00	0·54	0·64	0·30	0·21
II. Harpurhey	0·93	0·76	0·53	0·34	0·42	0·45	0·50	0·67
II. Moston	0·57	0·66	0·30	0·42	0·65	0·18	0·44	0·11
II. Newton	0·52	0·47	0·49	0·57	0·27	0·39	0·44	0·29
II. Bradford	0·75	0·42	0·58	0·49	0·49	0·69	0·53	0·68
II. Beswick	0·75	0·43	0·68	0·67	0·49	0·33	0·52	0·57
II. Clayton	0·68	0·24	0·78	0·51	0·56	0·61	0·54	0·40
III. Ardwick	1·30	0·80	0·74	0·94	1·02	0·98	0·86	0·75
III. Openshaw	1·12	0·84	0·80	1·11	0·99	0·78	0·90	0·73
III. West Gorton	1·12	0·75	0·67	0·76	0·81	0·64	0·73	0·73
III. Rusholme and Kirks.	0·84	0·97	0·91	0·86	0·46	0·58	0·76	0·49
III. Chorlton-upon-Medlock	0·83	0·66	0·69	0·77	0·67	0·58	0·67	1·10
III. Hulme	1·03	0·96	0·87	0·97	0·92	0·83	0·91	0·92
III. Moss Side	..	..	..	..	..	..	..	..
III. Withington	..	..	..	..	..	..	..	..

The death-rates from Tuberculosis other than Phthisis have a general relation to those occurring from Phthisis, but do not closely follow them.

Here, also, the highest death-rates are in the Manchester Township, the poorest part of the City, and next in South Manchester.

The improvement in every district, except Ancoats, is striking. It is, however, greatest in North Manchester, though nearly as great in South Manchester.

The changes do not closely correspond with those manifest under Phthisis. This may arise from two causes. Tubercular diseases other than Phthisis as causes of death, belong for the most part to early childhood. Changes are thus

introduced into the death-rates by reason of the varying proportions of young children in different districts. But it will suffice to consult a table of the birth-rates to see that this cause of difference is totally inadequate to account either for the differences in death-rate at a given epoch or for the changes which have occurred.

The mean death-rate from Tubercular diseases other than Phthisis was, in the period 1891–1900, greatest in South Manchester. For the five years 1901–05 the death-rate of this division has taken a second place when compared with that occurring in the Manchester Township.

But, again, these diseases are largely of abdominal origin, and own two chief sources—cows' milk and human infection.

It is probable that the population of North Manchester has been most largely supplied with milk produced within the City, while the Manchester Township has received very little milk from Manchester cowsheds.

It may be, therefore, that the relative improvements in North and South Manchester are due to the improvement in the Manchester milk supply proper.

If so, milk must be responsible for much of the Tuberculosis of childhood, since in spite of the comparatively stationary, or apparently stationary, Phthisis mortality in the Manchester Township, there has been a decided reduction in the death-rate from Tuberculosis other than Phthisis.

It is interesting to observe that the reduction in this death-rate is for the most part greatest in districts in which special attention is paid to the milk supply, or which have special facilities for obtaining milk from farms in the City. This applies to Cheetham, Crumpsall, Blackley, Harpurhey, and Moston.

But great reductions are also noticeable in Ardwick, Openshaw, and West Gorton, where this factor cannot be supposed to have special operation.

Generally, Tuberculosis amongst the young has declined more than it has in older persons, and it is possible that improvement in the milk supply—due to the operation of the Manchester Milk Clauses—has had to do with this.

There is, however, another possibility which must be kept in view. We have seen that the Phthisis death-rate began to improve remarkably in 1903, and that this may be ascribed (partly, at all events) to the operation of voluntary notification in the City. Now we have to recollect that there are causes in the Central parts of Manchester which prevent the effects of such work being fully manifest. They are to be expected rather in families which receive prolonged attention, and in families above the poorest, these last being least amenable to instruction. We should thus expect the improvement occurring in children in the Manchester Township to be greater than that observed under Phthisis. In fact we should expect this generally, because men are subject to adverse conditions, many of which they cannot control, while children are affected chiefly by the conditions of home.

It may be, therefore, that the increased attention paid to safeguarding the household by personal precautions on the part of consumptive adults has also had to do with the diminished mortality from Tubercular disease other than Phthisis.

Notification of Phthisis.

The subsequent tables were compiled by Mr. G. H. Lock from the records of the Tuberculosis Office, which have been under his charge since the commencement of voluntary notification.

The following table shows the number of cases of Phthisis notified in 1906, referred, in the case of Union Hospitals, to the district from which they have come. These notifications are given also in quarters, and side by side with the total number of notifications is the number of deaths referred to the district, and also the death-rate.

TABLE I.—PHTHISIS, 1906.

	CASES NOTIFIED					DEATHS		DEATH-RATE
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total	1906		Per 1000 living
City of Manchester	**402**	**324**	**311**	**342**	**1379**	**1089**		**1·71***
I. Manchester Township	209	134	124	165	632	383		2·99
II. North Manchester	57	75	58	37	227	193		1·03
III. South Manchester	136	115	129	140	520	513		1·59†
I. Ancoats	66	33	39	69	207	108		2·48
I. Central	55	38	34	33	160	113		4·28
I. St. George's	88	63	51	63	265	162		2·79
II. Cheetham	18	19	12	8	57	32		0·78
II. Crumpsall	...	3	2	3	8	6		0·65
II. Blackley	2	2	2	...	6	9		0·94
II. Harpurhey	7	9	6	9	31	26		1·24
II. Moston	...	3	4	3	10	13		0·72
II. Newton	9	17	15	10	51	46		1·19
II. Bradford	13	15	8	4	40	35		1·40
II. Beswick	6	5	4	...	15	17		1·37
II. Clayton	2	2	5	...	9	9		0·72
III Ardwick	19	17	17	20	73	80		1·81
III Openshaw	8	12	10	12	42	23		0·80
III West Gorton	15	13	12	11	51	52		1·65
III Rusholme and Kirkmanshulme	14	5	6	6	31	31		1·18
III Chorlton-upon-Medlock	34	30	38	37	139	123		2·18
III Hulme	39	25	39	48	151	140		2·19
III Moss Side	7	12	7	5	31	28		1·00
III Withington	...	1	...	1	2	36		0·84

* Excluding Moss Side and Withington 1·80. † Excluding Moss Side and Withington 1·78.

There is apparent from this table no uniformity as regards variation of numbers notified according to season, nor, for that matter, as regards variation in the number of deaths.

Table II.

Particulars Of Cases Notified From Institutions During The Year 1906.

Institutions	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Manchester Union Workhouse	138	82	58	103	381
Chorlton Union Workhouse	40	41	40	45	166
Prestwich Union Workhouse.....	4	3	3	1	11
Poor-law Union Cases	2	...	2	3	7
Consumption Hospital	82	85	101	59	327
Ancoats Hospital	14	9	14	22	59
Chorlton-upon-Medlock Dispensary ...	5	2	3	1	11
Hulme Dispensary	4	1	1	2	8
Gartside Street Dispensary	...	1	2	...	3
Royal Infirmary	26	13	12	16	67
Medical Mission, Red Bank	2	...	2	3	7
Northern Hospital	2	...	...	1	3
St. Mary's Hospital	3	8	4	9	24
Southern Hospital	...	...	...	...	...
Children's Hospital, Pendlebury	...	...	...	...	...
H.M. Prison	...	...	...	...	...
Jewish Hospital	...	1	...	...	1
Cases from Death Returns	...	...	...	...	6
Total	322	246	242	265	1081
Private Practitioners	80	78	69	71	298

It is, however, remarkable that the number of notifications should exceed the number of deaths. This is most conspicuously the case for the Manchester Township.

Partly the cases do not remain in the district, this being especially the fact for the Manchester Township, and partly all cases notified do not prove to be suffering from Phthisis.

The proportion of cases notified to deaths does not materially differ for the Manchester Township and for North Manchester. From the social position of the cases notified, we may fairly assume that in proportion to the amount of Phthisis, the work of prevention is greater in North Manchester than in the Manchester Township. This may be assumed to be still more the case for South Manchester, where the notifications bear a considerably higher ratio to the death-rate than they do in the Manchester Township, a considerably higher proportion of the cases notified being amenable to instruction in the former district. Contrary, then, to what we should expect, having regard to the aggregate numbers notified, the work of the Corporation is probably more effective in North Manchester and in South Manchester than in the Manchester Township.

This will be better understood when the above figures are compared with the details of cases notified from institutions. (See Table II.)

A considerable proportion of the cases given in this table as coming from the Manchester Union Workhouse, and a smaller proportion of those coming from Chorlton Union Workhouse, do not afford very favourable material for preventive work. This does not apply to the other institutions mentioned in the table, the cases treated at which are for the most part householders.

Table III. shows the numbers notified in successive years since 1899, and distinguishes poor-law cases, cases notified by institutions other than the Union Hospitals, and cases notified by private practitioners :—

TABLE III.

PHTHISIS, 1906—NUMBER OF CASES NOTIFIED.

Year	Poor-law Cases	Institutions	Private Practitioners	Total
1900	578	455	540	1573
1901	625	373	341	1339
1902	667	305	303	1275
1903	556	550	251	1357
1904	512	440	250	1202
1905	527	588	291	1406
1906	565	510	304	1379
Total	4030	3221	2280	9531

Table IV.—Statistics Relating to Phthisis.

	1906	1905	1904	1903	1902	1901	1900	1899 Sep. 1 to Dec. 31	Totals
s Visited and Registered—									
ales	929	817	745	848	917	959	786	231	6232
emales	464	565	471	515	532	546	538	194	3825
Totals ...	1393	1382	1216	1363	1449	1505	1324	425	10057
ses Disinfected—									
By Corporation—									
(*a*) With solution of chlorinated lime only	495	475	449	484	601	792	581	No Record	3877
(*b*) With lime solution only	0	0	0	0	2	15	109		126
(*c*) By Esmarch's method and solution of chlorinated lime	1042	1086	788	643	359	144	0		4062
Totals ...	1537 (in 1346 houses)	1561 (in 1387 houses)	1237 (in 1084 house-)	1127	962	951	690	...	8065
. By Tenants—									
Esmarch's method	2637 (in 1566 houses)	2016 (in 1267 houses)	2266 (in 1404 houses)	2118	1937	1776	1299	No Record	14049
Totals...	4174	3577	3503	3245	2899	2727	1989	...	22114
cimens of Sputum Examined:									
Positive	349	298	242	239	248	232	104	...	1712
Negative	562	475	418	389	337	285	154	...	2620
Totals ...	911	773	660	628	585	517	258	...	4332
aths—									
(*a*) Among total cases visited and registered	680	566	661	578	652	638	560	93	4428
(*b*) Among all cases for Manchester (including those under *a*)	1089	988	1106	1023	1145	1142	1133	270	7896
ases reported as sent to Hospital	1541	1349	1207	1159	1166	1012	851	140	8425
otified from common lodging-houses..	223	155	188	206	239	254	146	41	1452

It will be seen that during the last two years the numbers notified have increased. No doubt this is due partly to the provision made for the isolation of cases of Phthisis in Clayton, and subsequently to the reception of certain cases into the Crossley Sanatorium.

Further informationis given in Table IV., entitled "Statistics in relation to Phthisis," which summarises a portion of the work done in connection with notification.

The number of cardboard boxes given out during the year was 12,994.

The number of pocket spittoons given out during the year was 198.

In connection with the disinfection of houses, 2,440 special cases were entered in the business book. This work includes letters to owners, tenants, health visitors, etc.; the making out of forms 1, 2, and 3; receiving reports, giving instructions, checking costs, endorsing forms.

Among the above particulars is a classification of deaths in successive years certified as due to Phthisis, according as they have or have not been in persons previously notified.

It will be seen that there has been a steady diminution in the number of deaths in persons who have not been previously notified as suffering from Phthisis.

The same table shows an increasing proportion of cases treated in hospital.

The line referring to common lodging-houses is one, however, which gives grounds for uneasiness. In 1906 the cases giving addresses at common lodging-houses have again increased. It is not easy to say precisely what this may mean. It may mean, however, that the same stringency is not being used in regard to common lodging-houses. Not that such stringency reduces the amount of Phthisis except by gradual decrements, but that increased stringency diminishes the inclination of the Phthisical person to give his correct address.

It will be seen that, altogether, more cleansing is being effected in houses. This does not imply that more disinfection is being carried out of bedding and clothing, though, as a matter of fact, such is the case. In this particular, however, progress may with advantage be made.

More specimens of sputum are being submitted to examination. It is not to be assumed that 562 out of the 911 persons whose expectorations were examined did not suffer from Phthisis.

Nevertheless, negative results yield valuable information, and positive results of examination also greatly assist us in insisting on precautionary measures.

Reception of Cases into Hospital.

This subject has been already touched upon in connection with the effect of segregation in Union Hospitals on the history of Phthisis in England and Wales. We have seen that, in spite of considerable deductions from the beneficial effects which we might reasonably presume to have been experienced from this cause, we cannot divest ourselves of the impression that advantage must have accrued—limited, however, by the opposing forces of poverty, overcrowding, ignorance, and dirt. In the case of Ireland, the emigration of the most enterprising portion of the people may also be supposed to have exerted an unfavourable influence, as well as the intermarriage and bovine infection attaching to a rural population.

If, now, we could isolate those advanced cases of Phthisis who would presumably cause infection at home, who are not likely to be treated in the Union Hospitals, and who are further unable to secure proper isolation and treatment at home without impoverishing their households and without endangering some members of their household, and if, at the same time, the persons isolated are carefully instructed in the personal precautions needful to be taken, we must, in no inconsiderable measure, limit still further the amount of infection produced in the community both through isolation and through the diffusion of a knowledge of the precautions to be taken.

This is the course of action begun in 1901 at the Smallpox Hospital in Clayton Vale, interrupted by the outbreak of Smallpox in 1903, and renewed in 1904. During last year the sixteen male and sixteen female beds in occupation at the cottages in that institution have been in almost constant occupation.

The length of time during which the patients have been kept under treatment has been determined by a variety of circumstances. Many have died. Others have improved so much that they have been discharged, or have asked for their discharge. Family and other circumstances have determined the discharge of others. Many cases have remained, however, over a prolonged period.

The numbers in hospital at the end of 1905 were 16 males and 16 females. There were admitted, during 1906, 41 males and 29 females. The latter include two male children. Of the total treated during the year there died 7 males and 8 females, and there were discharged 18 males and 33 females. There remained in the hospital on December 31st, 1906, 16 males, 20 females.

The condition of the patients under treatment in Clayton Hospital is of great moment, as determining how far the preventive benefit attaching to prolonged treatment in the hospital is accompanied by benefit to the health of the patients themselves.

I have therefore asked Dr. Goldsmith to tabulate the facts recorded with regard to the patients treated during 1906, and Mr. Lock has added a column showing the condition of those of the patients who were discharged from the hospital during that year, and have not died.

It will be remembered that similar tables were prepared and placed before the Hospitals Sub-Committee at the end of 1906 for all cases admitted, under the Manchester scheme for the voluntary notification of Phthisis, in and since 1904, either into the Crossley Sanatorium or into Clayton Hospital, and that the history of cases was, in these tables, brought up to the end of December, 1906.

The two sets of tables complement each other usefully, enabling us to see how the scene shifts after a lapse of six months.

First we may summarise the information to be gathered from the earlier and longer table.

We learn, therefrom, as regards the history of the cases during their stay in Clayton Vale Hospital, that of a total of 77 male cases received into the hospital in 1904, 1905, and 1906, 10 showed marked improvement both in their general health and in respect of their pulmonary lesions, while 25 showed decided general improvement, although the lung conditions were comparatively stationary. Twelve patients died while in hospital.

On the female side, 44 cases in all were admitted during 1905 and 1906. Eight of these showed both general and pulmonary improvement, in 12 there was general but no lung improvement, and 9 died in the hospital. These facts relate purely to the experience of the patients while in the hospital.

They must be regarded as favourable if we consider the severe and advanced character of the disease from which the cases admitted into this hospital were generally suffering on admission. Nothing can be more striking than the manner in which patients, not a few of them apparently sinking, begin to pick up directly after admission, and regain no inconsiderable measure of comfort and strength, while putting on weight to a surprising extent. This depends on such factors as—

1. Removal and shielding from the worries of home ;
2. Good and ample food ;
3. Skilful treatment and nursing.

It is well known that Phthisis runs a much more rapid course amongst the working classes than it does in well-to-do households. It would almost seem as if the patients, on admission into Clayton Hospital, revert, in general, to the condition which they would have been in had their circumstances been comfortable and the age of their disease unaltered, and as if the disease then pursued, as a rule, the same slow downward course which it follows in such well-to-do households.

Hence, we could not expect that the improvement gained would be maintained amongst the patients discharged from Clayton Hospital, and, in fact, it is depressing to observe the manner in which a large section of the patients discharged, either from Sanatoria or from Segregation Hospitals, begin to fail rapidly soon after leaving the Institution.

We must, therefore, expect that when the subsequent history of the cases is followed the results will prove very different from those obtained immediately in the course of treatment in hospital.

The following table summarises up to the end of 1906 the history of all cases who have been treated in Clayton Hospital:—

MALES.

Year	Cases Admitted	* Cases Discharged	Died in Hospital	Dead December, 1906	Discharged and now fairly well, lungs improved, December, 1906	Discharged and now fairly well, lungs not improved, December, 1906	In full work, December, 1906	Partially working, December, 1906	Lost sight of	Still in Hospital, December, 1906
1904	20	In 1904, 5 In 1905, 8 In 1906, 2	3	14	0	0	0	0	1	2
1905	24	In 1905, 8 In 1906, 8	5	10	3	2	3 (? 4)	0	1	3
1906	39	24	4	10	2	2	3	0	2	11

* These include 2 admitted in 1904, discharged in 1905, readmitted, and still in the hospital.

FEMALES.

Year	Cases Admitted	Cases Discharged	Died in Hospital	Dead December, 1906	Discharged and now fairly well, lungs improved, December, 1906	Dicharged and now fairly well, lungs not improved, December, 1906	In full work, December, 1906	Partially working, December, 1906	Lost sight of	Still in Hospital, December, 1906
1905	21	9	6	8	3	0	3	1	1	6
1906	22	6	2	5	1	0	0	0	1	14

The horizontal lines in the above table relate only to the cases admitted in the corresponding year.

We thus see that of 20 males admitted in 1904 15 have been discharged, and of these 11 have died. None are doing well.

Of 24 males admitted in 1905, 16 have been discharged, of whom five have done well, while five have died. Of the five who have done well, three have exhibited marked improvement in the lungs. Of these, three, and probably four, were in full work in December, 1906.

In 1906, 39 were admitted, and 24 were discharged, of whom seven have died. Of the remaining 17 only four are known to have continued to maintain their ground, of whom two exhibit sustained improvement in the condition of the lungs.

It is not a brilliant record, but it is more satisfactory than one would have anticipated.

The record of the women is less satisfactory in appearance.

It is to be remembered, however, that both among the men and women a considerable number remain in hospital, of whom some are likely to give good results.

Indeed, so far as the result of treatment is concerned, the progress of patients has, in recent times, been quite as satisfactory as at any former period.

Clearly, however, it is chiefly on its preventive work that the value of the hospital is to be judged.

That the patients continue to do so well is due in no small measure to the judgment and skill of Dr. Goldsmith, Assistant to the Medical Officer of Health, and to the nursing staff.

Another course of action, advocated by Dr. Newsholme, might be pursued, viz., to remove patients to hospital, thoroughly instruct them in preventive methods, and return them to their homes after, perhaps, a month of treatment. It is probable that the instruction which we give to cases at their own homes does, on the whole, most of the good in respect of instruction which is experienced in respect of these hospital cases. Yet it may be that a still further grounding in the principles of preventive action might be secured by systematic instruction in hospital.

Also, there is no doubt that a valuable respite and impulse to improvement may be received during such temporary treatment. Moreover, this mode of dealing with cases is applicable to an entirely different class of cases from

those whom we have been hitherto treating for prolonged periods, viz., to people who are capable of returning to work after such a rest, and also to persons whose family circumstances permit of isolation and of the observance of sufficient precautions at home.

Many of these are at present received into the Bowdon and Crossley Sanatoria for a full period of treatment. Many, however, cannot be received, and of these the most suitable individuals might be received into a hospital for rest and for instruction.

By this means also patients might receive treatment at a comparatively early stage of their illness who are now excluded from the Crossley Sanatorium and Bowdon Hospital owing to pressure on space, and might thus be saved losing so much ground that no hope of recovery remains. The usefulness of the Bowdon and Crossley Sanatoria could in this way be greatly extended, as it would be open to them to continue the treatment thus begun.

At the present time no effort is made to get patients in an early stage for Clayton Hospital, and, in fact, none are admitted except an occasional case who does not fulfil the conditions of the Corporation for admission into the Crossley Sanatorium, and cannot gain admission into the Delamere or into the Bowdon Sanatoria.

The conditions of the Corporation for admission into the two institutions differ.

As regards Clayton Vale Hospital :—

1. The patient must not previously have been in a Union Hospital. (This condition has not been absolutely adhered to.)

2. The illness must have been previously notified to the Public Health Office.

3. A written undertaking is required that the patient admitted into Clayton Hospital will remain as long as the Medical Officer of Health desires, and will leave when, in his opinion, it is desirable that he should return. The relatives undertake that they will receive him back.

4. The patients must be vaccinated on admission, if not successfully vaccinated at a recent period.

5. No visiting friends who have not been recently vaccinated with success may be admitted, unless their immunity from Smallpox for other reasons can be proved.

As regards the Crossley Sanatorium, the conditions are :—

1. The patient must come from a family sufficiently large to make isolation difficult at home, and should belong to the working classes.

2. The expectoration must have been shown to contain tubercule bacilli.

3. The patient must not be suffering from advanced Phthisis ; the arbiters on this point being the physicians of the Consumption Hospital.

4. The patient's illness must have been notified to the Medical Officer of Health.

It has been found that, under these conditions, the number of applications for admission does not always suffice to fill the 20 beds allotted to the Corporation. The object of the conditions is, of course, to secure the maximum result in the way of prevention from the cases sent in by the Corporation.

This condition is, doubtless, fulfilled, and here again much valuable preventive work is done, both by isolation and by instruction, also where the patient is cured or greatly improved.

It is evident, however, that the conditions are not calculated to secure the admission of cases at the very commencement of Phthisis, and, in any case, such patients are not easy to find.

As a matter of fact, the cases are often moderately advanced in the disease.

The facts for patients admitted into the Crossley Sanatorium on behalf of the Manchester Corporation corresponding to those already furnished for Clayton Vale Hospital are given on page 146.

They do not show a result materially different from that obtained in the Clayton Hospital. No doubt, on the average, the cases sent in by us were more advanced in stage than those sent in by the physicians of the Consumption Hospital. This in some degree follows from the condition that tubercle bacilli must be contained in the sputum, a condition imposed in order to insure that we are in reality removing from the household an active source of infection.

If, in 1905, some cases were admitted too advanced in the disease to admit of improvement, that rests with the physicians, since, although we examine every case and record the condition, we leave entirely to the hospital the

determination of their suitability for treatment. No doubt, some misunderstanding existed on this point, but it may be hoped that the matter is now clear. There is difficulty in getting cases in a sufficiently early stage of the disease which fulfil all our conditions. This fact, however, has permitted the effect of prolonged treatment to be thoroughly tested.

In 1905, 30 cases were admitted into the Crossley Sanatorium. Of these, seven showed (during residence) marked improvement both in general condition and in the condition of the lungs, and four showed general improvement without corresponding improvement in the lungs; one died.

In 1906, 32 cases were admitted. Of these, five showed marked improvement in the condition of the lungs and generally, and one showed general improvement only; one died of Tubercular Meningitis. In eight cases the results are not yet declared.

The history of these cases up to May, 1907, is shown in the following table. Of the 30 cases admitted in 1905, 10 have died; two, discharged with lungs and general health improved, have remained fairly well; four, discharged with lungs not improved but in better general health, have remained fairly well; seven are in full work. (See Table, page 146.)

Of the 32 cases admitted in 1906, six have died, four discharged with the condition of the lungs improved have remained fairly well, and two whose general condition had improved, but not their pulmonary condition, have remained fairly well, four are in full work, two in partial work, and two have been lost sight of. One case from 1905 and six from 1906 are still in hospital. The remaining cases are not doing well.

Valuable, then, as are the results in prevention of infection from the treatment of these cases, it cannot be said that the results as regards cure are in advance of those obtained at Clayton Hospital, having regard to the character of the cases.

The general results exhibited in the Annual Report of the Hospital for Consumption, etc., are, of course, much better than those shown here.

CROSSLEY SANATORIUM.

Year	Cases Admitted	Cases Discharged	Died in Sanatorium	Dead, May, 1907	Discharged with lungs improved, and now keeping well	Discharged with lungs not improved, but now well	In full work, December, 1906	Partially working, December, 1906	Lost sight of	Still in the Sanatorium
1905	30	28	1	10	2	4	7	0	3	1
1906	32	25	1	6	4	2	4	2	2	6

It is to be remembered that the results obtained in the Corporation cases at the Crossley Sanatorium are obtained with comparatively unfavourable

material, and it is therefore desirable to give the results of treatment as set forth in the last published report of the Consumption Hospital, being that for the year 1905 :—

EXTRACT.

Adopting this classification, the figures for the two institutions are as under :—

	1st Stage		2nd Stage		3rd Stage		Totals	
	Bowdon	Delamere	Bowdon	Delamere	Bowdon	Delamere	Bowdon	Delamere
Cured	9	23	0	2	0	0	9	25
Much improved.	32	33	9	5	0	0	41	38
Improved	28	13	57	11	7	23	92	47
Stationary	10	6	29	9	21	36	60	51
Worse	1	0	6	0	9	2	16	2
Death	0	0	1	0	0	2	1	2
	80	75	102	27	37	63	219	165

In connection with this table, attention must be drawn to the relatively high percentage of cases in the third stage at the Crossley Sanatorium. At first sight, taken in conjunction with the previous statement that more suitable cases were admitted to that institution, it might seem contradictory, but it must also be remembered that the occupants of the 20 beds maintained by the Manchester Corporation are included in the above figures, and that it is customary to send these patients, even though the disease is in a more advanced state than is usually considered suitable.

These are much more encouraging figures, but they are not by any means equal to those claimed for the treatment of cases caught at the very commencement of the disease. Now, even if clinical evidence alone is relied upon, it is by no means easy to get patients for treatment at the very beginning of their illness. It is to this fact that we must ascribe the comparative poorness of the results. It is, however, to me extremely doubtful whether, anywhere, a large proportion of cases of undoubted established Pulmonary Tuberculosis go on to complete and permanent recovery. On the other hand, it is certain that the earlier the stage of the disease the more likelihood there is of this result being attained. It is, therefore, of first importance that the patients should be sent into hospital at the very commencement of their illness. So far as I can judge, the chief impediment in the way of attaining this object lies in the reluctance of bread-winners, and mothers, to leave their homes until they are compelled. This is a difficulty which we cannot hope entirely to overcome.

But it is one which would be removed to a large extent if there were security for the maintenance of the family during treatment of the person attacked.

This matter has, I know, been acutely felt by the Authorities of the Consumption Hospital, and they have given to it some practical attention.

The feeling of the bread-winner is a justifiable one. Supposing any members of the family to have already undergone infection, it is vital that they should be in good physical condition to throw it off. It needs only to observe the manner in which the most advanced cases of Phthisis improve, at the least for a time, after admission into hospital, to perceive the immense effect of good nourishment and freedom from worry on the resisting power of the body. How much greater must be the effect of these influences on the early stages of infection ?

Some of the severe cases in Clayton Hospital, after having achieved striking improvement, have been discharged, and after remaining some time at home have been re-admitted into hospital. They have lost ground rapidly at home, and have rapidly improved on re-admission.

There can be no doubt at all that the chief reasons are the comparative freedom from care and the suitable feeding in the hospital.

These conditions are, therefore, all important both in the treatment and in the prevention of consumption.

As we have seen, the chief value of treatment—at all events, in our cases—lies in the aid to prevention which they afford. This aid concerns not only the families under treatment, but also all the families visited under our notification scheme. The prospect of gaining admission, whether into the Crossley Sanatorium or into Clayton Hospital, has had a most beneficial effect on the notification of Phthisis, and thereby, it may be assumed, on the reduction of the disease.

Even, however, on the point of the curative effect, the results are not so bad as they seem. Mr. Farr calculated that the value of the life of an agricultural labourer of middle age might amount to £300. That of an artisan can scarcely be put at less than £500. Two artisans completely cured annually, therefore, might represent in value the entire annual expense incurred by the Corporation in connection with the Crossley Sanatorium.

This remark is not so likely to apply to Clayton Hospital, though here also this consideration has value.

From this point of view the measures for securing the early notification and treatment of cases of Phthisis becomes a first-rate consideration, as they do also from the point of view of averting infection. We are thus led

to a consideration of the manner in which the problem of preventing Phthisis is affected by the conditions of nutrition in families. In a paper read by Alderman McDougall to the British Medical Association in 1902, he points out the intimate association between the degree of poverty in different parts of Manchester, and the death-rates not only from all causes, but also from the chief causes of death. This association is especially manifest in the case of Phthisis.

It is very easy for us to see why poverty causes an increase in the death-rate from Phthisis. Poverty affects all that class of people who, either from constitutional feebleness of nerve endowment, or from natural temperament, earn merely enough to satisfy the bare requirements of existence, and many of whom congregate in common lodging-houses under conditions highly favourable to the propagation of Phthisis. It includes also those who, from indulgence in alcohol or gambling, have been brought to penury, and whose families are thus reduced to straits. The woman has often, perforce, to work in such cases, and the children are neglected, or she herself drinks, and their condition is even worse than in the first case. The family moves miserably from dwelling to dwelling, sampling, now one tuberculous dwelling, now another.

But there are many to whom these observations do not apply. The father has, perhaps, become phthisical while the children are yet young, and the family is reduced to poverty. Or the phthisical father dies, and the widow has to go out to earn an inadequate livelihood, leaving the children to their own devices. Or, again, it may be the oldest son who is attacked, and who is the bread-winner for the family.

It is true Tuberculosis is not the only illness which produces poverty, but it is the chief infectious illness which does so. Under such circumstances, Phthisis passes readily from one member of the family to another, and sometimes whole families are invaded by the disease in one or another form.

It may be suggested that in many of these cases also the habits of the sufferer have helped to produce his illness, and, no doubt, that is so. Many of those attacked have not been total abstainers. They have, perhaps, visited public-houses and contracted their disease there. Or they have been exposed to infection while at work, and have there contracted the disease, which, possibly, they would not have done had they kept their systems in better working order. It is certain, however, that many temperate people do, in the course of their work, or at all events apart from any discoverable source of infection at home, contract the disease. And in such cases the main fact is that the poverty, and consequent exposure to infection, is due not to drink, but to Phthisis.

It is, perhaps, desirable that some allusion should be made to another source of infection. We have seen that the experiments of the Royal Commission

show that bovine Tuberculosis is communicable to man, by way chiefly, no doubt, of tuberculous milk. Here also, the resisting power of the population depends on its physical condition. It may happen not infrequently, and this will be matter for special investigation, that bovine Tuberculosis once introduced into a family by a child is transmitted to older members. It is even possible that human Tuberculosis is, to no inconsiderable extent, renewed in this manner by tuberculous milk, and would undergo considerable decline if this source of infection were removed. Even, however, if this were so, once it is communicated to the older members of the family, the propagation of the disease is greatly accelerated by the poverty thus induced.

In this connection we may recall the fact that, in a high proportion of instances, persons who have died from other causes, when autopsied, reveal healed lesions of Phthisis.

We have, as yet, no knowledge of the conditions under which recovery has occurred. Has it been due to natural vigour of constitution, to favouring circumstances as regards nutriment and clothing, to the type of invading bacillus, or to a combination of all of these causes ?

It is possible that the bacillus of human Tuberculosis, as distinct from the bovine, presents many shades of virulence, and that to this circumstance may be ascribed, in part, the widely varying histories of patients under treatment, even when their lesions are in an advanced stage. The influence of nutrition, *per se*, may be supposed to be thus called in question. But we have only to recall to ourselves the widely different incidence of fatal Phthisis on poor and on well-to-do districts to perceive that nutrition has much to do with the matter.

The question may, however, be attacked in a more direct manner. Mr. Lock has prepared, with the assistance of Dr. Goldsmith, a statement (herewith given) showing for a number of cases discharged from Clayton Hospital the subsequent course of their illness in relation to their circumstances.

From this it would appear that nutrition has a decided influence on the history of these cases after discharge.

It may be confidently asserted that, other things being equal, the same is true to a still greater degree as regards the stage of invasion.

An examination of this table, which brings the cases up to date, appears to show not only that nutrition has a marked effect on the progress of the cases, but also that the results attained in Clayton, when exhibited in this manner, appear much more favourable than they do when simply set forth in a numerical table. The greater improvement is due, mainly, however, to the later period (May, 1907) to which the facts refer.

survived to the present time.

CLAYTON CASES.

Prog. No.	Sex	Age	Condition on Discharge	Date of Discharge	Food, etc.	Subsequent reports on Patient's Health
925/04	M	19	Good condition. 2 lobes	Oct. 19, 1905	Good	Lost ground, then gained. Now in full work
855/04	M	17	Good condition. 2 lobes slightly	Oct. 25, 1905	Good	Improved. Worked when he could find it
896/04	M	52	? 2 lobes	Nov. 4, 1904	Good	About same. Unable to work
1011/04	M	20	? No record	Nov. 27, 1904	Good	Improved. Not working
904/04	M	21	? Bad condition. ? 3 lobes	Aug. 5, 1905	Only fair	Not improving. Cannot work
1073/04	M	31	2 lobes	June 26, 1905	Short	Lost ground Died in 6 months
146/05	M	50	Bad. 2 lobes and cavity extending	Nov. 13, 1905	Good	Stationary. Cannot work
134/05	M	11	Good. 1 lobe	March 7, 1906	Good	Appears to have recovered
444/05	M	23	2 lobes	May 1, 1906	Good	Improved, then stationary. Worked, but had to give it up
478/05	M	26	2 lobes. ? cavity. ? extending	May 10, 1906	Good	Improved, but cannot work
469/05	M	48	2 lobes (1 slight)	March 7, 1906	Moderate	Losing ground. Worked 10 weeks, then ceased
742/05	M	34	2 lobes	April 7, 1906	Workhouse	Losing ground
1110/05	M	41	2 lobes. Cavity	Dec. 4, 1905	Good	Improved and worked. Died in 1 year
1197/05	M	45	2 lobes	May 10, 1906	Short of food, then good, and eats well	But losing ground. Cannot work
76/06	M	38	2 lobes. ? extending	March 24, 1906	Scarce	Lost ground.
1187/04	M	43	? Good condition. 1 lobe	March 24, 1906	Good; but cannot eat	Not improving. Works 2 days a week
1207/05	M	13	Good condition. Lungs improved	Dec. 5, 1906	Good	Improving. Full work
352/05	M	38	? 2 lobes	Aug. 22, 1906.	Short	Losing ground. Worked for a time, then ceased
1349/05	M	31	? 2 lobes. Deficient expansion, both lungs	May 23, 1906	Good	Losing ground. Cannot work
482/06	M	35	2 lobes. ? extending	Oct. 9, 1906	Good	Improving. Lives on pension
543/06	M	42	2 lobes. Much improved	July 17, 1906	Good	Improving. Works full time
465/06	M	20	2 lobes	July 17, 1906	Good	Improved. Relapsed. Died in 8 months
931/05	M	39	2 lobes. ? extending	Aug. 21, 1906	Fairly good	Did not improve at first, then improved. Works full time
1000/05	M	35	1 lobe	Oct. 3, 1906	Good	Improving. Full work
894/04	F	10	No record. In Monsall	Feb., 1905	Good	Improved, then slow relapse
930/04	F	16	No record. In Monsall	Feb., 1905	Good	Improved. Now goes to school
301/04	F	36	2 lobes	Sept. 3, 1906	Short. To seek relief	Worse. Unable to work
561/04	F	20	2 lobes	March 7, 1906	Short	Losing ground, but working
187/05	F	37	2 lobes	May 3, 1906	Good	Gained, then lost rapidly

CLAYTON CASES—*continued.*

Prog. No.	Sex	Age	Condition on Discharge	Date of Discharge	Food, etc.	Subsequent reports on Patient's Health
950/05	M	7	1 lobe. (? other lung slightly)	Jan. 19, 1907	?	Quite well. Going to school
1001/05	F	12	2 lobes	July 16, 1906	Appetite poor. Food good	Lost. Gained. Now losing
1345/05	F	35	1 lobe. (? other lung slightly)	May 23, 1906	Good, but no appetite	Losing ground. Work tires her
354/06	F	14	2 lobes	Dec. 5, 1906	Good	Lost ground. Now improving

The corresponding facts, ascertained for cases discharged from the Crossley Sanatorium, are:—

183/05	M	40	Spare. 2 lobes	Sept. 12, 1905	Very short	Lost ground. Died
252/05	M	20	Good condition. 1 lobe	Oct. 26, 1905	Good	Not improving, but working
563/05	F	34	Spare. Much spitting. All lobes	Aug. 28, 1906	Fair	Died very shortly
575/05	M	49	Spare. Cough had 3 lobes	Feb. 27, 1906	Plenty of plain food	Rapid loss. Died
683/05	F	18	Good conditon. 1 lobe	Dec. 2, 1905	Good	Improving. Full work
816/03	F	18	Good condition. Dull and harsh all over back	Oct. 30, 1906	Good	Improved, then slight loss. Stationary. Able to work
759/05	F	20	Spare. 2 lobes	Nov. 21, 1905	Good, but no appetite	Gained. Got married, and then lost ground. Died
764/05	F	38	Good condition. Larynx and 1 lobe	Nov. 4, 1905	Good	No cough or spit. Working.
905/05	F	17	Good condition. 2 lobes and ? cavity.	April 10, 1906	Doubtful	Stationary, then lost, and died
1097/05	M	27	Good condition. Larynx and 1 lobe	Sept. 1, 1906	Good	Not improving. Spits blood slightly, but working
840/05	M	32	Spare. 1 lobe	Jan. 27, 1906	Good	No cough or spit. Working
1135/05	M	24	Good. 1 lobe	April 17, 1906	Very poor	Not improved. Now in Clayton
1063/05	M	26	Good condition. Spit profuse. 2 lobes.	May 15, 1906	Probably short	Not improving. Cannot work
1320/05	M	33	Good condition. 2 lobes	Sept. 11, 1906	Good, but poor appetite	Losing ground. Works, but is fatigued
298/06	F	16	Good. 1 lobe	Oct. 23, 1906	Good	Improving. Full work
355/06	M	28	Spare. 2 lobes	Sept. 6, 1906	Good	Improving. Does light work
395/06	F	29	Good condition. 1 lobe	June 4, 1906	Plenty of rough food	Not improving. Soon fatigued
403/06	F	19	Good. 1 lobe	Oct. 23, 1906	Good	Improving. Can now work a little
440/06	F	15	Spare. 1 lobe involved	Oct. 16, 1906	Good	Improving. Full work
472/06	M	44	Spare. 2 lobes and extending	May 22, 1906	Poor	Worse. Could not work. Died
1126/04	F	23	Good condition. 2 lobes and extending	Oct. 23, 1906	Poor	Worse. Work tries her
707/06	F	13	Spare. Larynx and 2 lobes	Feb. 12, 1907	Good	Worse. Unable to work
1024/04	F	33	No record *	About Feb. 27, 1906	Good	Well. No cough or spit. Full work.

If, however, nutrition has so powerful an influence on the cure, and, *a fortiori*, on the prevention of the disease, as the various considerations and facts adduced go to show that it has, and if, in addition, it is the danger of poverty befalling the family which causes the reluctance of phthisical persons to seek early medical advice, and to take the steps necessary to obtain cure, then it becomes necessary to have regard to the circumstances of the family when invaded by Phthisis, and indeed by Tuberculosis in any form. It is the old story with regard to sanitation and specific measures directed to particular cases. If we are to expect the greatest results from specific measures directed to particular cases in dealing with the prevention of Phthisis, the maintenance of nutrition in families invaded by Phthisis is equally the most direct way of obtaining those results in relation to Phthisis which would accrue in less measure from a general increase in well-being.

Now, of course, there exists a machinery for the aid of families of insufficient means in the poor law administration. This machinery, however, is applicable to poverty resulting from whatever cause, and has not hitherto taken account of the special circumstances attaching to Phthisis, or of the special needs existing in that disease. Nor can there be any dispute that, in singling out a special disease for favoured consideration, one must show very strong grounds on the score of public benefit. It appears to me very clear that the grounds are indeed very strong. This disease is one which manufactures pauperism, owing to its duration. It is especially fatal to the fathers and mothers of families. In its propagation and progress it is eminently amenable to good nourishment and adequate clothing. Finally, from the prospect of the want of these necessaries, the sufferers are prevented from taking timely measures to arrest their own illness and to protect their families.

Now, in my opinion, the relief given under the poor law has been frequently inadequate to the object here set forth. It is, I am informed, made conditional as far as possible, in one union at all events, on the patient being removed to the Union Hospital. It is, perhaps, owing to this cause, viz., the fear that the family will be inadequately supported, that there is a widespread reluctance on the part of these persons to seek relief. As we have seen, the fear of privation at home is a great obstacle to phthisical persons seeking early admission into the Crossley Sanatorium. It may be assumed, therefore, that this cause will operate still more strongly in the case of the Union Hospitals.

At all events, whatever the causes, I am satisfied that this reluctance does exist to such a degree as materially to diminish the power for good which the Poor Law Authorities might exercise in special cases. The increasing recourse of patients to the Union Hospitals in recent years would appear to show, however, that there has been some diminution in this feeling.

Prior to the present year no precise inquiries were made into the circumstances of patients suffering from Phthisis, as, in the absence of our ability to give assistance, such inquiries might easily create administrative difficulties. The facts collected, however, under our scheme of voluntary notification give a general indication of the position of the family, and a preliminary list could be made out of members of families who might be supposed to be in difficulties.

Such a list was accordingly made out by Mr. Lock, and inquiries were made, in the present year, as to the means of the families tabulated.

The following table shows the result :—

TABLE SHOWING FOR CASES NOTIFIED IN 1906, IN WHICH IT WAS SURMISED FROM THE NOTIFICATION RECORDS THAT PRIVATION EXISTED, THE RESULT OF INQUIRY INTO THE CIRCUMSTANCES OF THE FAMILY, UNDER THE HEADS OF "INCOME," "RELIEF SAID TO BE RECEIVED," "AMOUNTS REQUIRED FOR SUITABLE FOOD," "AMOUNTS REQUIRED FOR RENT," AND "AMOUNTS REQUIRED FOR HOUSEHOLD SUNDRIES," WITH THE SHORTAGE WHICH APPEARS TO EXIST PER WEEK, NOT TAKING INTO ACCOUNT THE RELIEF GIVEN UNDER THE POOR LAW.

Prog. No.	Food	Rent	Household Sundries	Income	Relief said to be received	Shortage
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
432/06	11 11	6 9	4 11	None	..	23 7
127/06	10 3	3 0	5 0	10 0	..	8 3
1157/06	10 3	4 3	5 0	15 3	..	4 3
883/06	8 9	4 6	4 4	25 0	..	..
836/06	14 8	7 6	6 1	6 0	15 0	22 3
508/06	12 7	5 0	5 0	15 0	..	7 7
779/06	14 0	5 9	5 6	17 6	..	7 9
705/06	10 2	4 0	4 4	12 0	..	6 6
1014/06	16 1	6 4	5 8	12 0	..	16 1
1113/06	17 6	4 6	7 3	17 0	..	12 3
128/06	12 7	4 0	4 4	15 6	..	5 5
1077/06	11 11	4 0	4 11	4 0	5 0	16 10
391/06	14 4	4 3	5 6	5 0	..	19 1
81/06	14 4	5 0	5 7	17 6	..	7 5
1065/06	13 8	7 6	5 6	40 0	..	..
870/06	10 3	5 9	5 0	20 0	..	1 0
26/06	12 11	6 0	5 6	10 0	10 0	14 5
1040/06	16 5	4 6	5 8	23 9	..	2 10
1047/06	7 8	4 3	3 9	2 0	8 0	13 8
790/06	4 11	(?) Free	3 1	5 0	..	3 0
715/06	11 7	4 6	4 11	16 0	..	5 0
908/06	9 10	5 4	4 4	27 0	..	..
986/06	9 1	6 0	4 4	36 0	..	..
944/06	10 2	3 8	4 11	16 0	..	2 9
21/05	19 7	5 0	6 10	19 6	..	11 11
1064/06	10 3	4 9	5 0	12 0	5 0	8 0

CASES NOTIFIED IN 1906—*Continued.*

Prog. No.	Food	Rent	Household Sundries	Income	Relief said to be received	Shortage
	s. d.	s. d.	s. d.	s, d.	s. d.	s. d.
27/07	18 2	4 6	6 7	13 0	..	16 3
420/06	10 6	3 9	4 4	16 0	..	2 7
651/06	14 4	4 6	5 0	18 0	..	5 10
9/06	14 0	4 6	6 1	15 0	..	9 7
482/06	12 7	5 0	5 0	22 4	..	0 3
655/06	13 8	6 4	5 0	42 0	..	..
813/06	9 5	5 0	4 4	35 0	..	..
1006/06	11 2	5 3	4 5	27 0	..	..
806/06	8 5	5 0	3 9	8 6	..	8 8
426/06	11 2	5 9	4 11	16 0	..	5 10
648/06	20 4	5 3	6 10	33 0	..	..
1123/05	12 7	3 6	5 6	4 0	..	17 7
419/06	13 8	5 6	4 5	23 0	..	0 7
654/06	6 4	6 0	3 2	37 6	..	..
5/06	9 5	4 9	4 4	8 0	3 0	10 6
352/06	12 7	4 8	5 0	28 6	..	..
480/06	17 10	3 3	7 3	29 0	..	..
637/06	10 10	5 0	4 5	18 0	..	2 3
65/06	18 11	14 0	6 10	41 10	..	..
197/06	12 7	4 9	5 6	9 0	..	13 10
529/06	10 10	5 0	4 11	20 0	..	0 9
324/06	8 5	5 3	3 9	20 0	..	..
759/06	8 9	3 9	4 4	3 0	4 6	13 10
603/06	20 4	8 6	6 11	21 0	..	14 9
840/06	8 9	8 0	4 4	36 0	..	..
780/06	14 8	5 0	6 1	27 0	..	..
958/06	8 1	1 6	3 9	8 6	4 0	4 10
429/06	17 6	5 0	6 9	20 0	..	9 3
1096/06	10 6	4 8	4 4	7 0	..	12 6
18/07	8 9	4 6	4 4	None	6 0	17 7
728/06	24 10	7 6	8 7	43 0	..	..
931/05	16 1	8 0	5 1	34 0	..	..
1060/06	14 4	6 6	5 1	15 6	..	10 5
264/06	12 7	3 3	5 6	12 0	(+)	9 4
184/06	18 2	4 6	6 3	17 6	..	11 5
543/06	7 4	6 0	3 8	12 0	..	5 0
	£39/4/1	£15/19/3	£15/18/7	£57/0/2	..	£21/3/3

Average shortage 62 families .. 6/10.

The amounts required under food are calculated on Atwater's scale, the weekly rent is given in the household rent book, and household sundries are assumed to be on the same scale as in Rowntree's book. No doubt there is much waste going on in poor households, and Chittenden's investigations appear to show that perfect health may be attained on a much lower allowance of nitrogenous food than has hitherto been believed to be necessary.

These investigations, however, were conducted on men in the prime of condition, and with abundant opportunities for outdoor exertion. They are not applicable to children, and they do not appear to be applicable to cases of Phthisis. No doubt, a healthy man is better without any excess of nitrogenous matter, but the facts of treatment appear to show that, in their combat with the tubercle bacillus, the tissue cells are in a better position when backed by some excess of nutriment. How far these observations are applicable, or can be made applicable to the ordinary unregulated conditions of life, remains to be worked out.

It is quite possible that the diet of the agricultural labourer is one on which the inhabitants of the poorer parts of a great city would not thrive. At all events, it is not applicable to all classes. Even in the country there are great differences of digestive capacity. But it is not disputed that, with careful education in the cooking of common articles of diet, so as to present them in an appetising form, much of this difficulty could be removed.

The allowance on the Atwater scale relates to the cheaper articles of diet, and starts with 6d. per day per adult man, and it is open to any one reviewing the facts to present them in whatever fashion he likes. The facts are available.

It will be seen from this table that on the assumptions made, in 41 out of 62 instances investigated, the means of the family invaded by Phthisis did not suffice to procure suitable clothing and other household necessaries and to pay the rent, nor would this number be materially altered by changing the scale of diet. If clothing and other necessaries be omitted, the number is reduced to 34. If rent be omitted, the number is reduced to 19.

We must be struck, *inter alia*, by the large number of families who are not receiving relief. This is only made possible by the amount of assistance which poor people receive, especially from each other, and in some cases by the food supplied to children at the elementary schools. But in many cases there must be absolute privation, and its consequence is the propagation of Phthisis.

The absolute accuracy of the facts embodied in the above table can, of course, not be vouched for. But, in order to be as sure of them as possible, I requested Mr. Lomax, Secretary to the Charity Organisation Society, to reinvestigate the cases, and to see whether any assistance could be given by the Society. This he was kind enough to do in 32 instances, and the means coming in were found by him to be substantially as here stated.

Mr. Lomax states that the Society cannot continue to assist in chronic cases, and that patients often cannot be induced to apply for relief to the Guardians, who, in the absence of application, cannot intervene.

It has been mentioned that—at all events in one Union—pressure is applied to the patient when application for relief is made to induce him to go into the Union Hospital. This is often, though not always, necessary. It is probable that, apart from the severance of domestic ties, there is reluctance in a number of cases owing to the deprivation of personal indulgences, such as beer and tobacco. But there are also many instances in which this difficulty cannot be supposed to hold. It is quite clear, however, why pressure to go into hospital should, in a number of cases, be applied, and in suitable cases there can be no doubt of the necessity for this course being pursued.

It would seem necessary to state that on no occasion has any patient been dissuaded from entering the Union Hospital by the Medical Officer of Health, by whom, on the contrary, patients often are and always have been urged to apply for admission.

To return to the general question. There certainly does appear to be a difficulty in extending a degree of assistance to cases of Phthisis in excess of that which is accorded in other instances, and it might be desirable, therefore, that this extra assistance should be given through other channels. The only other channels available are private charity and the Sanitary Authority. It is very doubtful whether private charity can be drawn upon to the extent required, and the Sanitary Authority appear to be the best source from which the assistance may be derived. The object is, not merely relief, but also the prevention of disease, and it is from the latter standpoint that the question is now being considered. If assistance were contributed by the Sanitary Authority it would be given in connection with the voluntary notification of Phthisis, and after all due inquiry had been made. It would also be given on conditions. These conditions would include :—

1. Cleanliness of the home.

2. Cleanliness and care in all respects of the children.

3. Strict observance of prescribed personal precautions to the satisfaction of the Sanitary Authority.

4. Disinfection as required by the Medical Officer of Health.

5. The expenditure of the total income, including any money allowed, would be shown in books entered up by local tradesmen.

6. When so required, the patient must enter a hospital, either a Union Hospital or a Corporation Hospital, according to circumstances, and must remain there if so desired.

It is difficult to say what expenditure would be necessary. If the table just given may be taken as showing the approximate sum, the total would be about £1,100 per annum. It is possible that some additional expenditure might usefully be made, having in mind that the object is the prevention of

Phthisis. For example, it might be advisable, in certain cases, where the family income was only just sufficient to meet their needs, to grant some assistance towards paying the rent of a larger house, with a view to secure isolation of the patient. Supposing 50 such cases presented themselves, though this would probably be in excess of the fact, and that the excess rent was 3s. a week, this would involve a further expenditure of £7 10s. a week, or £390 per annum. It would, of course, be necessary to obtain the sanction of the Local Government Board for this form of expenditure. But one may confidently say that, if carefully and suitably spent, no money expended on Public Health purposes would secure a better return, and that one might, therefore, hope for sanction of the expenditure for this specific purpose.

We may now consider what cases may suitably be treated in hospital and at home respectively.

So far as the immediate health of the sick person is concerned, the great majority of persons would be much better in hospital. This arises from the quiet of the hospital, the better food, and the constant supervision by a medical attendant and by nurses. Where, however, the family attachments are strong, and the family is not very pinched in circumstances, or in house room, it may be doubted whether the patient is not as well at home, and there are not a few cases—as, for instance, in mothers anxious about their family—where no benefit is likely to accrue in hospital under the most favourable treatment.

There is always some risk of infection at home. Yet it is certain that many patients will not be induced to go into any hospital, and we have, therefore, to consider whether, under any circumstances, persons of the working class may be treated with comparative safety in their own dwellings, and also successfully, as regards their illness. In my opinion, this may be done when the family can afford to allot a special room to the phthisical person, to give him the services of some one specially instructed member of the family, and to secure medical guidance and occasional visits, and when also the phthisical person is intelligent, has grasped fully the personal precautions to be taken, and when the necessary cleansings are carried out in the home. These conditions do not seem easy of fulfilment, but, with the exception of the second, they can generally be secured by sufficient instruction. On the other hand, in most cases, where recourse should be had to the Guardians, wherever also the family is numerous and the house room very restricted, it would be better for the family if the patient could be removed to hospital.

There is everywhere, however, a proportion of instances in which affection is so strong that it is doubtful whether it is justifiable to press for removal of the patients.

As regards the progress of the patient who remains at home, it is essential that he should be isolated, protected from worry, and well fed, and also that he should lead a carefully regulated life as regards exercise, diet, and hours of rest.

At an earlier stage, under careful treatment, and with the same precautions, he may continue at work, provided he is not losing strength and weight. His weight must be regularly taken, and if he loses weight, work must be stopped and the necessary rest obtained.

It is, indeed, very necessary to work out a scheme of home treatment, since there is no prospect of hospital accommodation being available sufficient to receive all, or even a majority of the cases ; nor is there any reason why a large section of the cases should not do well at home, and live there without endangering the rest of the family. The all-important matter is that the patient should lose no time in getting the fullest advice as to his mode of life.

It appears desirable to address a circular on this subject to the Medical Practitioners of the City, and to take other means by which phthisical families may be warned of the course which they should pursue in various circumstances.

As regards Hospitals for Consumptives, it is most important that in these institutions every patient should receive the fullest instruction as regards personal precautions, and be provided with the means of carrying them out. Most such hospitals receive also patients not suffering from Consumption, and these have to be safe-guarded. Moreover, the cases of Phthisis have to be protected one from the other. The attendants also require protection. We have had no experience of any infection of members of our staff, and the nursing staffs do suffer but very little in this country, a fact which may be put down to good food and reasonable hours of work as much as to the care exercised in other respects.

Adult patients are instructed at Clayton never to expectorate in the hospital or in the closet. They must use a spit-bottle out of doors, and an enamelled or tarred cardboard box indoors. In coughing they are instructed always to put a sheet of tissue paper in front of their mouth. They are instructed also not to swallow their expectorations.

The wards are kept thoroughly cleansed, and are disinfected from time to time. These elementary precautions should always be carried out in hospital.

History of Infection—1906.

Passing from this subject, we may next consider the result of our enquiries as regards the source of infection in 1906. It will be seen that fewer "likely" sources of infection are recorded than the average number for the five years 1902–1906. This is not to be taken as indicating less inquiry, but somewhat less decision is manifest in fixing on the most likely source of infection out of the multiple sources presented. This, perhaps, is due to the greater extent to which these inquiries have been conducted by special, non-medical, inquirers. As usual, domestic infection furnishes the largest number of sources, although both as regards domestic sources and fellow-workmen there is diminution. It is to be hoped that this may indicate greater care taken both in the home and at work.

SOURCES OF INFECTION—PHTHISIS, 1906.

Cases other than those notified from the Workhouses.

Most Probable Source of Infection	Likely 1902-1906	Likely 1906	Less Likely	Possible	Total 1906
Father	128	16	13	5	34
Mother	74	8	8	3	19
Brother	130	19	16	5	40
Sister	100	15	13	2	30
Husband	47	12	3	..	15
Wife	27	3	5	1	9
Uncle	20	4	2	..	6
Aunt	18	3	2	..	5
Son	22	5	5	..	10
Daughter	17	3	7	..	10
Grandfather	3	..	1	..	1
Grandmother	4	..	..	..	0
Nephew	1	1	1	..	2
Niece	2	..	..	..	..
Father-in-law	..	..	2	..	2
Mother-in-law	4	..	..	..	..
Brother-in-law	25	4	1	..	5
Sister-in-law	13	1	2	..	3
Cousin	10	3	2	..	5
Relatives	9	3	2	1	6
Companion	98†	21	28	4	53
Neighbour	29†	4	15	..	19
Tenant (Landlady, etc.)	14	..	3	..	3
Lodger, Fellow-lodger	28	2	5	1	8
Patients, Hospital, etc.	..	..	1	2	3
Employer	4†	..	..	..	..
Workfellow	114†	10	40	..	50
Workplace or Work	24†	2	89	13	104
Houses (including public-houses, etc.)	59†	3	65	1	69
Milk or Food	1	1	9	2	12
Club	..	..	1	..	1
Clothing	..	..	..	..	..
Re-infected	6†	..	4	..	4
Army	6	4	1	..	5
Extension from Bone, etc., Disease	..	..	5	..	5
Railway carriage	..	..	2	..	2
Infected out of Manchester	..	..	..	..	41
Multiple sources	..	..	..	..	129
No information	..	..	..	..	16
Schoolfellow	1	1	2	..	3
Total	1038	148	355	40	600*

* The 129 cases with multiple sources are not included in this total. † Four years.

SOURCES OF INFECTION—PHTHISIS, 1906.

Cases notified from the Workhouses.

Most Probable Source of Infection	Likely 1902-1906	Likely 1906	Less Likely	Possible	Total 1906
Father	30	2	3	1	6
Mother	29	3	9	..	12
Brother	47	5	6	..	11
Sister	39	7	4	..	11
Husband	33	2	3	1	6
Wife	39	7	6	..	13
Uncle	5	..	..	..	..
Aunt	..	..	2	..	2
Nephew and Niece	18	1	3	..	4
Son	17	6	1	..	7
Daughter	11	2	2	1	5
Step-brother	1	..	..	..	..
Father-in-law	3	..	1	..	1
Mother-in-law	..	..	2	..	2
Son-in-law	2	..	..	..	..
Brother-in-law	9	5	1	..	6
Sister-in-law	3	..	2	..	2
Cousin	3	1	..	..	1
Relatives	..	..	2	..	2
Companion	53†	12	18	3	33
Schoolfellow	1	..	3	..	3
Neighbour	13†	2	7	..	9
Tenant (Landlady, etc.)	10	..	3	..	3
Lodger and Fellow-lodger	22	2	14	4	20
Employer	..	..	2	..	2
Workfellow	38	4	23	1	28
Workplace or Work	27	..	56	2	58
Houses (including public-houses, etc.)	168	15	194	..	209
Army	22	3	2	..	5
Milk or Food	..	..	2	1	3
Asylum, Workhouse, etc.	3	1	3	1	5
Extension from Bone, etc., Disease	..	..	5	..	5
Infected outside Manchester	..	..	..	..	19
No information	..	..	..	..	97
Multiple Sources	..	..	..	..	180
Total	646	80	379	15	590*

* The 180 cases with multiple sources are not included in this total. † Four years.

The Workshop in Relation to Phthisis.

A paper was read on this subject to the British Medical Association in 1903. in which the various factors attaching to particular classes of work were considered. Attention was called to the great excess of the male over the female

Phthisis death-rate in large towns as compared with rural districts. This excess was believed to be largely occupational. But, in determining the nature of the occupational factor, account has to be taken of two facts, viz. :—

1. The much larger amount of expectoration which goes on in work-rooms occupied by males as compared with those occupied by females.

2. The excessive consumption of alcohol in certain occupations, particularly those afflicted with intermittency or irregularity of employment, and those attended with high temperatures.

In both the classes of occupation mentioned there is a general addiction to excess in alcohol, which is usually consumed in public-houses. Danger of infection here arises from two sources, viz., expectoration in the bar-room and parlour, and the use of imperfectly-cleansed glasses.

There is, however, special danger from public-houses for those workmen employed in the neighbourhood of common lodging-houses or of groups of common lodging-houses. In this manner, explanation was afforded of the anomalous incidence of Phthisis on certain workshops in a common lodging-house district.

All work pursued in confined places is more or less dangerous. At the end of the day, or at certain times, workmen get run down, and suffer from fatigue. If at those times they are exposed to infection, there is much greater risk of its obtaining a hold than when they are fresh. Moreover, men engaged in active employment draw in much larger quantities of air than when they are released from work. Hence, given the presence of tubercle bacilli in the workshop, the risk of storing up infection is greatest during active work. It matters not, in this connection, whether the infective matter be inhaled or swallowed.

Where, therefore, in any employment there is considerable expectoration by consumptive persons the risk is always great, and it should be manifest to every workman that if it is necessary to be careful at home it is at least equally necessary to be careful as regards expectoration in the workshop.

No effort has been spared to bring home to employers the great importance of this matter, and notices as regards expectoration have been widely distributed to workshops, and suspended in them.

It is especially, perhaps, in the closets attached to workshops that the greatest amount of mischief is done. Nor is the danger likely to be entirely removed until workpeople realise how great a risk they are inflicting and incurring by the deposit of expectoration either in the workshop or in the closets attached thereto.

We have in force a bye-law relating to expectoration in public places which has, so far as one can judge, been useful in the trams and in the Town Hall.

It runs as follows :—

(1) No person shall spit on the floor, side, or wall of any public carriage, or of any public hall, public waiting-room, or place of public entertainment, whether admission thereto be obtained upon payment or not.

(2) Any person offending against the foregoing bye-law shall be liable to a penalty not exceeding £5.

We need, however, the extension of some such bye-law to factories and workshops, and also to public-houses.

It has, probably, not even yet been realised that the expectoration is the most dangerous of all vehicles of infection. It should be elementary that the presence of expectoration in workshops renders the workshop dirty and necessitates thorough cleansing. It appears to me that this should be axiomatic alike for factories and for workshops, and should extend to the attached conveniences.

What an enormous amount of infection has been, and probably still is, deposited in workshops and the conveniences attached, in which last it is specially dangerous, may be realised from the perusal of the following table, showing the number of workmen notified to us, and the periods during which they have remained at work after the commencement of their illness, from 1899 to 1906.

PHTHISIS—SEPTEMBER, 1899, TO END OF 1906.
PERIODS OF ILLNESS WHILE STILL AT WORK.

Occupation	No. of Persons	Aggregate Period of Illness at Work Years	Average Years
Brass and Copper Workers	27	32 2/12	1 2/12
Bookbinders, Rulers, Folders, &c.	23	41 9/12	1 10/12
Butchers	19	25	1 4/12
Bar-tenders and Public-house Musicians	57	61 9/12	1 1/12
Publicans	14	16 3/12	1 2/12
Public-house Servants (other)	22	14 5/12	8/12
Public-house Charwomen	12	10 6/12	10/12
	106 persons		Average for Public-house, 1 year
Blacking Works	12	24	2
Building Trade :—			
Plasterers	5	11 6/12	2 4/12
Bricklayers	28	28	1
Labourers	55	53	1
Slaters, &c.	4	6	1 1/12
	92 persons		Average for Building Trade, 1 1/12 years
Bakers and Confectioners	25	30 2/12	1 2/12
Brushmakers	9	8 5/12	11/12
Carried forward			

PHTHISIS—*continued.*

Occupation	No. of Persons	Aggregate Period of Illness at Work Years		Average Years	
Brought forward.....					
Boxmakers (Cardboard)	18	21 1/12		1 2/12	
Cab Drivers	19	41 4/12		2 2/12	
Stablemen	24	21 1/12		11/12	
Calenderers, &c.	19	16 6/12		10/12	
Charwomen	147	177 8/12		1 3/12	
Clerks.....	122	163 9/12		1 4/12	
Clay (Tobacco) Pipe Makers	8	8 6/12		1	
Carters	88	127 4/12		1 6/12	
Coal Heavers.....	17	23 4/12		1 4/12	
Colliers (underground)	7	5 5/12		9/12	
Cap Makers	29	38 5/12		1 4/12	
Chemical Workers	14	21		1 6/12	
Calico Printers	2	1 2/12		7/12	
Corset Makers	9	12 9/12		1 5/12	
Dock Labourers	39	45 1/12		1 2/12	
Dyers	7	15 10/12		2 3/12	
Dyers' Labourers	19	18 1/12		1	
Enginemen (Crane, &c.)	24	22		11/12	
Furriers	5	14 9/12		2 11/12	
Furniture, &c., Brokers.....	11	20 3/12		1 10/12	
French Polishers	23	20 9/12		11/12	
Fustian Workers	6	5 5/12		11/12	
Gas Works Employés	20	20 4/12		1	
Glass Workers	20	23		1 2/12	
Hawkers.....	247	422 7/12		1 9/12	
Iron Workers :—					
Blacksmiths	15	22 10/12	313 persons	1 6/12	Average for Iron Workers, 1 3/12 years
Fitters.....	52	61		1 2/12	
Moulders	29	53 2/12		1 10/12	
Planers	9	13 10/12		1 6/12	
Drillers	15	36 1/12		2 4/12	
Grinders.....	12	13		1 1/12	
Turners	36	35		1	
Dressers	4	3		9/12	
Boiler Makers	10	9 3/12		11/12	
Labourers	93	100		1 1/12	
Various	38	47 5/12		1 3/12	
Laundresses	54	74 9/12		1 5/12	
Labourers (General)	348	433 2/12		1 3/12	
Millhands (Cotton) :—					
Weavers	41	42 5/12	144 persons	1	Average for Millhands, 1 year
Spinners	12	16 1/12		1 4/12	
Winders	36	40 10/12		1 2/12	
Various (Piecers, &c.)	55	46 10/12		10/12	
Mantle and Dress Makers	40	35 1/12		11/12	
Carried forward					

PHTHISIS—*continued.*

Occupation	No. of Persons	Aggregate Period of Illness at Work Years		Average Years	
Brought forward.....					
Printers (unspecified)	14	37	50 persons	$2\frac{8}{12}$	Average for Printing Trade, 2 years
,, Compositors.....	13	$16\frac{9}{12}$		$1\frac{8}{12}$	
,, Feeders.....	9	$10\frac{2}{12}$		$1\frac{1}{12}$	
,, Labourers.....	3	6		2	
,, Bronzers	2	8		4	
,, Relief Stampers	2	$1\frac{2}{12}$		$\frac{7}{12}$	
,, Lithographic	7	$19\frac{8}{12}$		$2\frac{10}{12}$	
Painters and Decorators	54	$61\frac{7}{12}$		$1\frac{2}{12}$	
Plumbers	23	$26\frac{5}{12}$		$1\frac{2}{12}$	
Porters (General)	41	52		$1\frac{3}{12}$	
,, (Market)	99	$133\frac{10}{12}$		$1\frac{4}{12}$	
Railway Employés :—					
Porters	28	$39\frac{5}{12}$	85 persons	$1\frac{4}{12}$	Average for Railway Workers, $1\frac{2}{12}$ years
Labourers	17	$22\frac{5}{12}$		$1\frac{4}{12}$	
Carriage Works	19	$19\frac{5}{12}$		1	
Various	21	$18\frac{7}{12}$		$\frac{11}{12}$	
Rag Sorters	23	$27\frac{4}{12}$		$1\frac{2}{12}$	
Rubber Works :—					
Garment Makers	24	$19\frac{5}{12}$	66 persons	$\frac{10}{12}$	Average for Rubber Workers, 1 year
Waterproofers.....	7	$5\frac{9}{12}$		$\frac{10}{12}$	
Labourers	9	$6\frac{1}{12}$		$\frac{8}{12}$	
Rubber Ball Makers	2	$\frac{7}{12}$		$\frac{4}{12}$	
Various	24	$31\frac{6}{12}$		$1\frac{4}{12}$	
Shoe and Slipper Makers	86	$171\frac{9}{12}$		2	
Shopmen	63	$69\frac{1}{12}$		$1\frac{1}{12}$	
Stone Workers	29	47		$1\frac{7}{12}$	
Sewing Machinists.....	124	136		$1\frac{1}{12}$	
Soldiers and Navy.....	34	$28\frac{6}{12}$		$\frac{10}{12}$	
Servants (Domestic)	95	$133\frac{1}{12}$		$1\frac{5}{12}$	
Tin Plate Workers.....	19	18		1	
Tobacco Workers	21	15		$\frac{9}{12}$	
Tailors	105	143		$1\frac{4}{12}$	
Tram Service.....	25	25		1	
Travellers (Commercial)	35	$58\frac{6}{12}$		$1\frac{8}{12}$	
Upholsterers	7	$5\frac{8}{12}$		$\frac{10}{12}$	
Umbrella Makers	22	36		$1\frac{8}{12}$	
Velvet Workers	10	13		$1\frac{4}{12}$	
Waste Workers	11	$9\frac{3}{12}$		$\frac{10}{12}$	
Wood Workers :—					
Joiners	79	102	161 person	$1\frac{4}{12}$	Average for Wood Workers, $1\frac{3}{12}$ years
Pattern Makers	8	$12\frac{2}{12}$		$1\frac{6}{12}$	
Cabinet Makers.....	28	$35\frac{9}{12}$		$1\frac{3}{12}$	
Sawyers	12	13		$1\frac{1}{12}$	
Packing Case Makers	15	15		1	
Coopers	16	$26\frac{7}{12}$		$1\frac{8}{12}$	
Wooden Skewer Makers	3	$2\frac{8}{12}$		$\frac{11}{12}$	
Carried forward					

PHTHISIS—*continued.*

Occupation	No. of Persons	Aggregate Period of Illness at Work Years	Average Years
Brought forward.....			
Warehouse Employés :—			
Warehousemen	105	129 7/12 } 257 persons	1 3/12 } Average
Makers up	37	26	8/12 } for Ware-
Packers	36	41 4/12	1 2/12 } house
Hookers and Stitchers	18	19 1/12	1 1/12 } Employés
Porters	61	77 10/12	1 3/12 } 1 2/12 years
School.....	254	281 9/12	1 1/12
Milliners	12	16 2/12	1 4/12
Unclassified	348	423	1 3/12
Total	4314	5447 11/12	1 3/12

Mortality of Occupations.

It has appeared to me desirable, with a view to greater precision in dealing with the dangers encountered in different occupations, that we should have a statement of the death-rates experienced in different classes of work. Mr. Lock has accordingly prepared such a statement. The death-rates are calculated on all persons enumerated at the Census as employed, at and over 10 years of age. These death-rates, therefore, take no account of the different age constitution of persons engaged in different employments. The deaths are shown, however at groups of ages, and these give a picture of the differences of employment as regards age, qualified by the fact that in some employments a heavy death-rate occurs earlier than in others.

The facts for females are omitted from the detailed table since, owing to the early removal by marriage of large sections of female workers, no reliable data as regards the effects of occupation can be secured.

The numbers employed in each occupation are those ascertained at the Census.

The deaths are, accordingly, those occurring in the last quarter of 1898, in 1899, 1900, 1901, 1902, and the first three quarters of 1903.

The Census summary of occupations is given, but this would be of little use for Manchester without more detailed statement, and, though with some hesitation, the detailed table for males is here printed.

SUMMARY.

Deaths from Phthisis for Five years ending 3rd quarter, 1903.

Males.

Occupations	10—	15—	25—	45—	65—	Total	Number employed	Death-rate per 1000 per annum
General and Local Government	..	1	9	6	1	17	2,495	1·36
Defence—Soldiers	..	1	7	..	..	8	721	2·22
Professional, etc.	..	6	31	9	2	48	4,374	2·19
Domestic Officers and Service	..	2	12	11	2	27	2,027	2·66
Commercial	..	43	97	53	5	198	13,172	3·00
Conveyance	2	81	335	170	11	599	28,710	4·17
Agriculture	..	..	3	9	1	13	930	2·79
Mines and Mining	..	..	9	2	1	12	1,520	1·58
Metals and Metal Goods	..	56	160	114	10	340	29,024	2·34
Precious Metals, etc.	..	1	6	4	1	12	2,456	0·98
Building, etc., Trades	..	17	115	128	9	269	17,451	3·08
Wood Workers	..	15	59	44	6	124	6,863	3·61
Brick, Glass, etc., Manufacturer	..	2	8	6	..	16	1,595	2·00
Chemicals, Soap, Rubber, etc.	..	7	27	10	..	44	4,149	2·12
Skin, Leather, Hair, etc.	..	1	15	7	1	24	1,221	3·93
Paper, Printing, etc.	..	20	28	23	1	72	4,817	2·99
Textile Fabrics	..	13	64	48	13	138	13,502	2·04
Dress	..	16	93	67	9	185	9,462	3·91
Food, Tobacco, Drink, Lodging	..	15	115	46	4	180	13,549	2·65
Electricity, Gas, Sanitary	..	5	11	16	3	35	1,966	3·56
General Labourers, Sundry Industries	..	77	416	329	51	873	13,533	12·90
Pensioners	..	..	2	4	1	7	27,551	0·05
	2	379	1,622	1,106	132	3,241	201,088	3·22
Females.								
Professional, etc.	..	2	10	4	1	17	3,990	0·85
Domestic Officers and Service	3	55	112	59	4	233	19,637	2·36
Conveyance	..	2	1	..	..	3	786	0·76
Wood Workers	..	2	1	..	1	4	980	0·82
Chemicals, Soap, Rubber, etc.	..	3	4	1	..	8	1,679	0·95
Paper, Printing, etc.	1	12	8	1	..	22	3,387	1·30
Textile Fabrics	..	63	42	20	3	128	17,159	1·49
Dress	..	68	75	20	1	164	24,998	1·31
Food, Tobacco, Drink, Lodging	..	10	10	..	..	20	8,576	0·46
General Labourers, Sundry Industries	..	7	12	5	..	24	1,985	2·41
	4	224	275	110	10	623	93,177	1·34

	Population		Deaths		Death-rate	
Total—Male and Female..	294,265	....	3,864	....	2·63	per 1000 per annum.

DEATHS FROM PHTHISIS FOR FIVE YEARS ENDING 3RD QUARTER, 1903.

MALES—DETAILED STATEMENT.

Occupations	10—	15—	25—	45—	65—	Total	Number employed	Death-rate per 1,000 per annum
I.—*General or Local Government.*								
1. Civil Service, Messengers, etc.	..	1	2	..	..	3	2,495	1·21
2. Police	..	..	6	5	1	12		
Municipal, etc., Officers	..	..	1	1	..	2		
	..	1	9	6	1	17		
II.—*Defence of Country.*								
Soldiers	..	1	7	..	..	8	721	2·22
	..	..	..	..	..	..		
III.—*Professional, etc.*								
1. Clerical—								
Other Ministers	..	..	..	1	..	1	316	1·31
Missionary	..	..	1	..	..	1		
2. Legal—								
Solicitors	..	..	..	2	..	2	92	4·35
Law Clerks	..	..	7	2	..	9	497	0·90
3. Medical—								
Subordinate	..	..	..	1	..	1	493	1·21
Dentist	..	..	1	..	..	1		
Sick Nurses	..	..	1	..	..	1		
4. Teaching—Teachers	..	1	3	..	..	4	668	1·21
7. Art, Music, Drama—								
Musicians, Vocalists	..	1	4	3	..	8	1,768	3·01
Artists, Engravers, etc.	..	3	5	..	1	9		
Photographers	..	..	1	..	..	1		
Architects	..	..	1	..	1	2		
Actors	..	..	2	..	..	2		
Theatre Service	..	..	2	..	..	2		
8. Games, etc.	..	1	2	..	..	3		
5. Journalist	..	..	1	..	..	1	221	0·90
	..	6	31	9	2	48		
IV.—*Domestic Officers and Service.*								
1. Indoor—								
Hotel, Lodging-house, etc.	..	2	4	..	..	6	477	2·51
Other Domestic Servants	..	..	..	..	..	..		
2. Outdoor—								
Coachmen, etc.	..	..	3	3	..	6	169	7·11
Gardeners	..	..	..	1	..	1		
3. Other—								
Laundry and Washing	..	..	1	..	..	1	104	1·92
Caretakers	..	..	3	4	2	9	1,077	2·41
Cooks (not domestic)	..	..	1	3	..	4		
	..	2	12	11	2	27		

DEATHS FROM PHTHISIS FOR FIVE YEARS ENDING 3RD QUARTER, 1903—*continued.*

MALES—*continued.*

Occupations	10—	15—	25—	45—	65—	Total	Number employed	Death-rate per 1000 per annum
V.—*Commercial.*								
Agents	..	..	6	6	1	13		
Merchants	..	..	5	6	2	13		
Auctioneers	..	..	1	..	..	1	3,579	
Accountants	..	..	1	..	..	1	70	3·9
Travellers	..	2	18	9	2	31	deaths	
Salesmen	..	3	3	3	..	9		
Officers of Guild, Society, etc.	..	..	1	1	..	2		
Commercial Clerks	..	34	57	28	..	119	8,068	2·9
Insurance Agents	..	2	2	..	..	4	1,525	1·2
Insurance Clerks, etc.	..	2	3	..	..	5		
	..	43	97	53	5	198		
VI.—*Conveyance.*								
Railway—								
Guards	..	..	..	1	..	1		
Drivers	..	..	1	..	..	1	6,988	
Platelayers	..	..	2	..	..	2		
Porters and Servants	..	3	14	4	..	21	54	1·6
Clerks and Officials	..	5	13	5	..	23	deaths	
Labourers	..	1	3	2	..	6		
Roads—								
Carters	..	18	48	29	2	97	8,861	2·5
Tramway Service	..	2	13	..	..	15		
Coach, Cabmen, Grooms	..	..	31	19	2	52	2,122	4·9
Water—								
Watermen	..	..	2	1	..	3	543	4·05
Seamen	..	3	4	1	..	8		
Docks—								
Officials and Servants	..	..	..	1	..	1	670	1·2
Dock Labourers	..	..	2	1	..	3		
Storeage, Messages, etc.—								
Warehouse Employés	..	36	106	57	3	202	5,985	12·0
Porters, Errand Boys	2	11	92	47	4	156		
Coal Heavers	..	..	4	2	..	6	2,235	0·71
Telegraph, Telephone	..	2	..	..	..	2		
	2	81	335	170	11	599		
VII.—*Agriculture.*								
Gardeners (not domestic)	..	..	2	6	1	9	450	4·4
Farmers	..	..	..	1	..	1		
Labourers	..	..	1	2	..	3	480	1·25
	..	..	3	9	1	13		

DEATHS FROM PHTHISIS FOR THREE YEARS ENDING 3RD QUARTER, 1903—*continue*
MALES—*continued.*

Occupation	10—	15—	25—	45—	65—	Total	Number employed	De r per I an
IX.—*Mines.*								
Coal Miners	..	..	5	2	..	7	1,110	1
Coal Dealers	..	..	4	..	1	5	410	2
	..	..	9	2	1	12		
X.—*Iron and Steel Manufacture*								
1. Furnacemen	..	..	4	2	..	6	358	3
3. Boiler Makers	..	1	4	3	..	8		
Fitters, Turners	..	23	41	27	3	94		
Blacksmiths, Strikers	..	1	16	17	2	36		
Other and Undefined	..	9	16	8	1	34		
Ironfounders (Moulders, etc.)	..	2	14	12	2	30	21,554	2
Brass Founders	..	..	2	1	..	3		
Brass Finishers	..	3	6	3	..	12	221	
Pattern Makers	..	..	3	1	..	4	deaths	
4. Tools—Tool Makers	..	1	5	10	..	16	456	8
File Makers	..	..	1	2	..	3		
5. Types, Dies, etc.	..	2	..	..	..	2		
7. Miscellaneous Metal Trades								
Screw and Nut Makers	..	1	2	..	..	3		
Nail Makers	..	..	1	..	..	1		
Chain Makers	..	..	1	..	..	1		
Ironworkers Undefined	..	2	7	7	..	16		
Wire Drawers, etc.	..	3	7	6	2	18	3,166	5
Locksmiths	..	..	..	1	..	1		
Lead GoodsManufacturers	..	1	1	..	..	2	80	
Electro-plater	..	..	1	..	..	1	deaths	
Other Metal Workers	..	..	1	..	..	1		
Tinplate Goods Makers	..	2	13	8	..	23		
Copper Workers	..	2	9	..	..	11		
8. Boat Builder	..	..	..	1	..	1	45	4
9. Wheelwrights	..	1	2	1	..	4		
Railway Wagon Makers	..	..	..	3	..	3	2,856	0
Coach Makers	..	..	1	..	..	1		
10. Ironmongers	..	2	2	1	..	5	562	1
		56	160	114	10	340		
XI.—*Precious Metals, Games, Watches.*								
1. Goldsmith	..	..	1	..	..	1	203	0
2. Watch and Clock Makers	..	..	4	1	1	6	317	3
Opticians	..	..	..	1	..	1		
Measuring Appliances	..	..	..	1	..	1	614	1
3. Musical Instruments	..	..	..	..	..	..		
4. Toys, Games, Makers	..	..	1	1	..	2		
5. Instrument Dealers	..	1	..	..	..	1	186	1
		1	6	4	1	12		

DEATHS FROM PHTHISIS FOR THREE YEARS ENDING 3RD QUARTER, 1903—*continued.*

MALES—*continued.*

Occupation	10—	15—	25—	45—	65—	Total	Number employed	Death-rate per 1000 per annum
XII.—*Building.*								
House Builders	..	..	1	1	..	2		
Joiners	..	8	15	27	3	53	4,042	2·6
Bricklayers	..	..	20	15	..	35	3,339	2·9
Bricklayers' Labourers	..	..	8	5	..	13		
Masons	..	..	19	23	..	42	901	9·8
Masons' Labourers	..	..	..	2	..	2		
Slaters	..	..	8	4	..	12	1,823	2·8
Plasterers	..	..	6	6	..	12		
Plasterers' Labourers	..	..	..	2	..	2		
Paperhangers	..	1	..	..	1	2	3,151	4·3
Painters, Decorators	..	5	25	32	4	66		
Plumbers	..	2	9	7	1	19	1,879	2·02
Other Works and Roads—								
Paviors and Labourers	..	1	2	2	..	5	2,316	0·8
Well Sinker	..	..	1	..	..	1		
Navvies	..	..	1	2	..	3		
	..	17	115	128	9	269	..	..
XIII.—*Wood, etc.*								
Furniture Dealers	..	..	1	1	2	4	538	1·5
Cabinet Makers	..	2	14	14	4	34	2,700	4·7
French Polishers	..	2	10	7	..	19		
Upholsterers	..	..	7	3	..	10		
Carvers, etc.	..	1	3	2	..	6	2,736 57 deaths	4·1
Basket Makers	..	..	3	2	..	5		
Cork Workers	..	..	..	..	..	..		
Sawyers	..	5	4	4	..	13		
Wood Box Makers	..	2	7	4	..	13		
Wood Turners	..	3	4	2	..	9		
Coopers	..	..	4	2	..	6		
Other Wood Workers	..	..	2	3	..	5		
	..	15	59	44	6	124	..	..
XIV.—*Brick, Glass, etc.*								
ottle Makers	..	1	4	2	..	7	858	3·3
ther Glass Workers	..	1	3	3	..	7		
rickmakers	..	..	1	1	..	2	589	0·7
	..	2	8	6	..	16		
V.—*Chemicals, Oil, Soap, etc.*								
Blacking Workers	..	..	1	1	..	2	1,149	1·2
Manufacturing Chemists	..	1	3	1	..	5		
Soap Boilers	..	..	..	1	..	1	2,345	3·15
Waterproof Goods Makers	..	3	8	..	..	11		
Rubber Workers	..	3	15	7	..	25		
	..	7	27	10	..	44	..	..

DEATHS FROM PHTHISIS FOR FIVE YEARS ENDING 3RD QUARTER, 1903—*continued*.
MALES—*continued*.

Occupation	10—	15—	25—	45—	65—	Total	Number employed	I p a
XVI.—*Skin, Leather, Hair, Feathers.*								
1. Furriers	..	..	1	1	..	2		
Tanners	..	..	1	1	1	3		
Leather Goods Makers	..	..	5	4	..	9	1,150	
2. Saddlers	..	..	1	1	..	2		
3. Brushmakers	..	1	7	..	..	8		
	..	1	15	7	1	24	..	
XVII.—*Paper, Printing, etc.*								
1. Paper Box and Bag Makers	..	..	2	2	..	4	840	0
Paper Maker	..	..	1	..	..	1	106	1
Other Workers in Paper	..	5	6	4	1	16		
Stationers	..	..	2	1	..	3		
2. Bookbinders	..	2	1	1	..	4	294	2
Printers	..	5	12	9	..	26*		
Newsagents	..	3	1	1	..	5	2,599	4
Booksellers	..	1	..	1	..	2		
Lithographic Printers	..	4	3	4	..	11*		
	..	20	28	23	1	72	*978	
XVIII.—*Textile Fabrics.*								
1. Spinning Processes	..	1	4	5	..	10	847	2
Winding, Warping, etc.	..	..	..	1	..	1	311	0
Weaving Processes	..	1	3	3	..	7	382	3
Fustian Manufacture	..	..	5	8	1	14	146	19
Undefined and other Processes	..	2	23	13	12	50	2,743	3
2. Wool Sorters	..	..	..	1	..	1	109	1
4. Mat Makers	..	1	..	..	..	1	206	1
Rope Makers	..	..	..	1	..	1		
5. Smallware, etc.	..	2	..	1	..	3	438	1
Lace Manufacture	..	..	1	..	..	1		
6. Callenderers, Finishers	..	1	4	7	..	12	3,428	2
Dyers	..	4	17	6	..	27		
7. Drapers	..	1	6	2	..	9	4,616	0
Other Textile Dealers	..	..	1	..	..	1		
	..	13	64	48	13	138	..	
XIX.—*Dress.*								
Clothiers, Outfitters	..	1	..	..	..	1†		
Hosiers	..	1	1	..	..	2†		
Hairdressers	..	2	10	5	1	18*		
Tailors	..	6	38	26	2	72	4,091	3
Shirtmakers, Seamstresses	..	..	..	1	..	1	249	0
Dressmakers	..	..	..	2	..	2	90	4
Hat and Cap Makers	..	2	..	3	1	6*		
Umbrella Makers	..	..	5	1	..	6*	*1,731	3
Boot Dealers	..	..	2	..	..	2†	†1,038	1
Boot Makers	..	2	26	25	5	58	2,263	6
Slipper Makers	..	2	11	4	..	17		
	..	16	93	67	9	185		

* Others. † Deal

DEATHS FROM PHTHISIS FOR FIVE YEARS ENDING 3RD QUARTER, 1903—*continued.*

MALES—*continued.*

Occupation	10—	15—	25—	45—	65—	Total	Number employed	Death-rate per 1000 per annum
X.—*Food, Tobacco, Drink, Lodging.*								
Fish Curer	..	..	..	1	..	1*		
Other Food Dealers	..	..	2	5	..	7†		
Bakers	..	..	11	10	1	22*		
Butchers	..	1	10	4	..	15†	* Workers	
Dairymen	..	3	1	..	..	4†	1908	2·8
Mineral Water Makers	..	..	..	2	..	2*	† Dealers	
Corn Millers	..	..	1	1	..	2*	7517	2·8
Fishmongers	..	..	8	1	..	9†		
Greengrocers	..	2	10	1	..	13†		
Grocers	..	5	19	5	1	30†		
Tobacconists	..	1	2	..	..	3	248	2·4
Tobacco Manufacturers	..	..	4	2	..	6	136	8·8
Brewers	..	..	5	1	..	6	377	3·2
Publicans	..	1	21	7	2	31	1,543	4·0
Cellarmen	..	..	2	1	..	3	1,366	4·0
Bar Tenders	..	2	18	4	..	24		
Lodging-house Keepers	..	..	1	1	..	2	356	1·1
	..	15	115	46	4	180	..	..
XXI.								
Electricity Supply	..	3	7	..	..	10	1,487	4·4
Gas Works Service	..	2	4	14	3	23		
Sanitary Service	..	..	..	1	..	1	479	0·83
Scavengers	..	..	..	1	..	1		
	..	5	11	16	3	35	..	..
XXII.—*Other.*								
Rag Gatherers, Dealers	..	1	4	3	..	8		
Chimney Sweeper	..	1	1	1	..	3		
Other Sundry Industries	..	..	5	7	..	12	Others 2,720 75 deaths	5·5
Bone Workers	..	..	1	1	..	2		
General Shopkeepers	..	3	..	6	1	10	659	4·5
Pawnbrokers	..	1	1	2	1	5		
Hawkers	..	6	62	41	4	113	2,053	11·0
Mechanics	..	2	1	1	..	4		
Factory Labourers	..	7	26	12	1	46		
Drivers, Stokers, etc.	..	4	4	6	1	15	1,681	1·54
General Labourers	..	52	311	249	43	655	8,420	15·5
	..	77	416	329	51	873	..	..
XXIII.								
Pensioners	..	..	2	4	1	7	2,593	0·54

There is this advantage in printing the above table in detail, that those interested in Manchester industries will have at one and the same time the numbers occupied in various kinds of work, and information as to mortality among persons pursuing special occupations.

As regards females, though the table is omitted for the reason stated above, the calculations have been made, and do furnish some information, taking into account the difficulty as regards marriage.

In the following occupations the death-rate from Phthisis exceeded 4 per 1,000 : Charwomen, 4·5 ; engaged in textile manufactures, other than spinners, winders, warpers, weavers, or fustian manufacturers, 5·3 ; general shopkeepers and pawnbrokers, 4·7. Why do these occupations stand out so conspicuously ? As regards charwomen, they are exposed in a quite special manner to tuberculous dust, while other persons engaged in textile manufactures include those occupied in carding processes and in working up cotton waste. In these occupations there is considerable inhalation of dust. But the effect of this kind of work in producing a social selection of the workers must also be taken into account. As regards general shopkeepers, these will often be widows of men who have died from Phthisis, and who may therefore be expected to have a high death-rate.

The next highest death-rates amongst employed women are 3·4 amongst fustian-cutters—this is a very dusty occupation, pursued in long, low old rooms in the roofs of cottage houses, and as the industry is not prosperous it is probably one which does not get the strongest workers ; 2·2 in nuns ; 2·5 in laundry women, who are exposed to special risks of infection ; 2·8 in indoor servants at inns, etc., who also run special risks of infection ; 2·1 amongst bookbinders, paper-makers, etc. ; 2·5 in spinning processes—the danger to spinners is not so much from infection at the workshop as from weakness caused by high temperature in a damp, still atmosphere ; 2·1 machinists—here again the work predisposes by causing fatigue and weakness ; hawkers 2·07—intemperance and exposure are elements in this case.

We see, then, that three chief causes come into play in occupations. Exposure to infection, unusual fatigue, and intemperance. Of these, exposure to infection appears to be the most important.

More reliance can be placed on the death-rates among men in different employments. By far the highest death-rate in any large class of workers is amongst general labourers, viz., 15·5 per 1,000. Amongst hawkers the death-rate is 11 per 1,000. The small class of fustian manufacturers has a death-rate of 19·2 per 1,000. Masons and their labourers have a high death-rate, viz., 9·8 per 1,000. Amongst those engaged in iron and steel manufacture, tool-makers and filemakers—a small group—have a death-rate of 8·3 per 1,000.

Warehouse employees, porters, and errand boys have the very high death-rate of 12 per 1,000. Tobacco manufacturers have a death-rate of 8·8 per 1,000.

In discussing occupational death-rates, such causes will be briefly assigned as have been ascertained or may be considered probable. When this subject was considered in 1902, the conclusions arrived at were somewhat as follows :—

Intemperance is the most formidable factor in the production of Phthisis amongst employed men. It produces its greatest effect through frequent visits to public-houses, where expectoration is often freely indulged in. Much of this expectoration is tuberculous. The frequenting of public-houses is most common amongst labourers and the inhabitants of common lodging-houses generally. Intemperance besets especially men engaged in hot and in dusty occupation. But it also pursues callings in which employment is irregular and intermittent. This cause obscures the real extent to which specially injurious processes predispose men to Phthisis.

The surroundings of workpeople react strongly on their habits and on their predisposition to Phthisis. Thus, persons employed in the centre of the City are liable to be found in common lodging-houses, in which Phthisis prevails to a terrible extent. From a Census taken by the Chief Constable in 1897, we learn that the classes most represented in common lodging-houses are, in order of number, labourers, hawkers, tramps, unemployed females, unemployed males, shoemakers, carters, mechanics, railway porters, stablemen, news-vendors, flower sellers, hotel porters, tailors, joiners, clerks, butchers, gas stokers, toy-sellers, millhands, washerwomen, blacksmiths, bakers, tram drivers, billposters, warehousemen, market porters, organ grinders, and others. (The actual numbers are given in the Annual Report for 1899.)

It may be assumed that many of these classes not in common lodging-houses would be living under insanitary conditions and in overcrowded dwellings.

There are, however, conditions of occupation which in themselves predispose to Phthisis. Thus, persons working at occupations which entail the absorption of arsenic, lead, or copper are specially predisposed to Phthisis. So are those engaged in occupations which produce specially irritating or infectious dusts—for example, in toolmaking, filecutting, iron turning and grinding, stone-cutting. Other occupations act by enfeebling the system and laying it open to attack, as, for example, tobacco manufacturing, and probably rubber working, spinning, machining.

In all of these, however, the social position, the surroundings, and the habits of the workpeople have a powerful influence.

It must always be remembered also that, once Phthisis is introduced largely into a particular class of work, whatever may be the other factors favouring

propagation, there is probably present in the workplace a considerable amount of infection from expectorated matters. In all cases, then, the removal of such matter becomes a first object.

Resuming consideration of the high death-rates in certain occupations pursued by males which have been already recorded, we may ascribe that of labourers to irregularity of employment, exposure, and consequent catarrh; the frequenting of public-houses, insanitary homes, and to the large number living in common lodging-houses. Infection in the lodging-house and in public-houses is a strong element in the production of the disease.

The high death-rate amongst fustian-cutters requires special investigation. It is possible that the number of workers is understated. The industry is a dwindling one, and the death-rate is one belonging to higher ages, which in some occupations is excessive.

As regards masons and their labourers, it is not easy to see why they should have a death-rate so much in excess of bricklayers and their labourers, unless it be from the injurious effects of stone-cutting or trimming, possibly also from confusion of terms.

Toolmakers' Phthisis is conditioned, partly, by metallic dust.

Workers in grey cloth warehouses have an excessive mortality. In these warehouses there is much expectoration and much direct infection. Not a few of the warehouses are badly lighted and ventilated. They cannot be easily cleaned. The cloth also may not infrequently be already infected on arrival. The warehouse porters do, no doubt, often introduce infection. Infectious dust is here the chief factor. There is also much production of dust, and china-clay is freely given off from the cloth.

As regards tobacco manufacturers, this class of work tends to the production of cardiac feebleness and anæmia, and the workers are thus predisposed to infection. The position of these works, also, influences the class of workers engaged in them.

The following occupations show a death-rate of 4 per 1,000 or upwards :—

1. Solicitors. Death-rate 4·4 per 1,000. It is probable that there is here a confusion of solicitors with law clerks.

2. Outdoor coachmen, etc. Death-rate 7·1 per 1,000.

3. Coachmen, cabmen, etc. Death-rate 4·9 per 1,000.

The high proportion of 223 living in common lodging-houses should be noted.

We have here to consider intemperance, exposure, and abode. Infection is received in the public-houses, in common lodging-houses, etc.

4. Watermen, seamen, etc. Death-rate 4·05.

It is probable that infection is often conveyed in small, badly ventilated cabins.

5. Gardeners and farmers. Death-rate 4·4. No explanation is here given. The death-rate attaches to gardeners, not to farmers, and may be due to irregularity of employment and its attendant evils.

6. Certain iron-workers and other workers in metals have a death-rate of 5·08. These employments are for the most part of the lighter kind. Some of them involve working with lead or copper, and these run up the death-rate of the group.

7. Paperhangers, painters, and decorators have a death-rate of 4·7 per 1,000. This is probably due to infection from stripping dry papers, and generally from working in infected houses.

8. French polishers and upholsterers have a death-rate of 4·7 per 1,000. French polishers in Manchester do not work under good sanitary conditions. They are exposed to the influence of lead, and may suffer also from chrome dyes. Upholsterers are exposed to the action of injurious dusts from the materials which they use.

9. Leather workers have a death-rate of 4·2 per 1,000. This work involves too many processes for brief consideration.

10. Printers have a death-rate of 4·6 per 1,000. There is a considerable amount of expectoration, at all events in some workshops. There is also a tendency to lead poisoning. Employment is partially irregular, and there is believed to be a considerable amount of alcoholism. Infection occurs both in the workplace and in the public-house.

11. Publicans and bar tenders have each a death-rate of 4 per 1,000, due largely, no doubt, to infection in the public-house.

12. Boot and slipper makers have the very high death-rate from Phthisis of 6·6 per 1,000. Like tailors, who also have a high death-rate, they work in such an attitude as to expose them specially to the inhalation of infectious dust. A large number live in common lodging-houses. There is probably a good deal of intemperance in this class.

13. The electric and gas services have a death-rate of 4·4 per 1,000. This is due in some degree to the position of the plant of these services. It is more especially among the stokers and labourers that the high rate occurs, and these men probably contract the disease at public-houses in the neighbourhood, at all events in part. A good many also live in common lodging-houses.

14. Rag gatherers, chimney sweeps, and bone workers all work under conditions highly irritating to the lungs. Their death-rate is 5·5 per 1,000. Infection is, no doubt, also received at the workshop amongst boneworkers, while rag gatherers and chimney sweeps are exposed to specific infection.

General shopkeepers and pawnbrokers have a death-rate of 4·5 per 1,000. The latter class is exposed to infection from infected clothing, the former to infection derived from phthisical persons. The life also is a trying one.

It will thus be seen that Phthisis exacts a heavy tax on workers under most various conditions of work. In all, the question of infection at the works, or elsewhere, is an important one.

The materials contained in our records permit of a minute examination in every case of the causes at work, but it would be very laborious to check the statements made here by such an examination.

The influence of social circumstances and habits is very important, and it has been customary to give a table showing the proportion of workers amongst the cases notified during the year who have been reported respectively from their

mes and from the Union Hospitals. Such a table throws valuable light on the cial position of those engaged in different occupations, and one is unwilling to omit from the report.

PHTHISIS, 1906.—Occupations of Notified Cases—Males.

Occupation	General	Crumpsall	Withington	Total	Total 1902-1906
rmen, etc.	16	2	5	23	68
kers	4	..	2	6	13–3 years
ushmakers	..	3	..	3	3
ass and Copper Workers	2	1	3	6	22–3 years
ilding Trade	8	16	5	29	122
rters	10	10	3	23	64–3 years
mmercial Travellers	8	2	1	11	38
tton Manufacture	10	2	1	13	37
erks	25	3	2	30	128
ach, Car, Drivers, etc.	6	2	1	9	25–4 years
ck Labourers	1	7	3	11	51
yers, etc.	6	3	3	12	54
ench Polishers	4	2	1	7	16–3 years
sworks Employés	3	4	1	8	24
ass Workers	..	2	..	2	21
neral Labourers	31	60	24	115	339–4 years
wkers	12	37	8	57	170
rsekeepers	..	3	2	5	11–2 years
usepainters	5	1	4	10	29–3 years
irdressers	1	..	..	1	7–3 years
nworkers	42	19	18	79	376
ather Trade	3	2	..	5	10–3 years
bourers (Chemical)	..	..	..	..	4–3 years
rket Porters	5	22	2	29	119
ttern Card Makers	2	..	..	2	6–2 years
inters	5	2	..	7	42
umbers	5	..	1	6	17–3 years
rk, etc., Butchers	2	1	3	6	10–4 years
bber Workers	5	..	3	8	58
ilway Employés	15	5	2	22	72
holars and Scholastic	36	..	3	39	106–3 years
ldiers	11	2	3	16	81
oemakers	9	2	2	13	83
ilors	9	3	2	14	76
legraphists	1	1	..	2	2–1 year
arehousemen (excluding Porters)	31	5	8	44	198
arehouse Porters	1	15	4	20	87
ood Workers	26	9	10	45	176
hitesmiths	1	5	..	6	13–2 years
lliers	1	2	..	3	3–1 year
op Attendants	7	5	..	12	12–1 year
nclassified	31	10	8	49	49–1 year
Total	390	280	138	808	2842

PHTHISIS, 1906.

Occupations of Notified Cases—Females.

Occupation	General	Crumpsall	Withington	Total	Total 1902-19
Cotton Manufacture	21	10	4	35	155
Charwomen	12	13	8	33	219
Do. at Public-houses	3	1	1	5	28
Domestic Servants	10	2	8	20	94
Fancy Box Makers	2	1	1	4	14–3 y
Housework	100	12	12	124	673
Hawkers	..	7	1	8	40–4 y
Laundresses	10	4	1	15	50
Machinists	38	3	1	42	198
Milliners and Dressmakers	1	..	..	1	20–4 y
Printing and Binding Trade	3	1	..	4	13–3 y
Rubber Workers	6	..	..	6	27–4 y
Rag Sorters, etc.	5	3	..	8	18–3 y
Scholars and Scholastic	39	1	3	43	123–3 y
Smallware Manufacture	..	..	..	..	5–3 y
Tobacco Workers	4	..	..	4	8–3 y
Tailoresses and Mantle Makers	7	4	1	12	33–3 y
Public-house (except Charwomen)	6	..	..	6	36
Shop Attendants	4	..	1	5	17–2 y
Metal Works Employés	..	..	..	..	7–2 y
Furriers	..	..	..	..	2–2 y
Clerks	7	..	..	7	10–2 y
Brushmakers	..	..	..	..	3–2 y
Waitresses, etc. (Restaurant)	5	..	..	5	5–1 y
Theatrical	..	..	1	1	1–1 y
Cooks	1	..	1	2	2–1 y
Lodging House Keepers	1	1	..	2	2–1 y
Unclassified	13	3	3	19	19–1 y
Total	298	66	47	411	1822

It will be seen that in the following occupations the majority are notifie from the Union Hospitals :—

Males.

Persons engaged in the building trade.	Hawkers.
Carters.	Horsekeepers.
Dock labourers.	Market porters.
Gasworks' employees.	Pork, etc., butchers.
General labourers.	Warehouse porters.

Females.

Charwomen.	Hawkers.

These figures, then, agree generally with those furnished by the Census of common lodging-houses taken by the Chief Constable, and with the excessive death-rates shown in certain occupations, and point to the abode and to social condition as exercising a powerful influence.

They also furnish some indication of the extent to which pauperism is produced by Phthisis, and, with some modifications, they may be made to yield more information on this subject.

The small proportion of women treated in the Union Hospitals as compared with those treated at home, contrasted with the fact that the majority of occupied men included in this table were treated in the Union Hospitals, shows the impoverishing influence of Phthisis when it attacks the bread-winner. It is true a larger proportion of men than of women is sent from the common lodging-houses into Union Hospitals, but this fact will not remove the significance of the figures on the subject.

Conclusion.

It will be seen that the combat with Tuberculosis is entering on new phases, and that it is necessary, at all events, to see where previous efforts have failed, and in what directions we must look for ultimate success.

(1) In the first place, efforts to deal with Tuberculosis in animals are certain to become more strenuous. Especially necessary will it be to consider the measures required to safeguard cows' milk. The recent report of the Royal Commission would appear to indicate that the eradication of Tuberculosis from dairy herds will have to be aimed at. This, however, is a prospect so great, and involving such vast issues, that one hesitates to recommend any course for the present by way of hastening events. Meanwhile, our control over the City supply should be extended so far as this may be done with so imperfect a means as the Manchester Milk Clauses. It will also be necessary to consider whether the inspection of the carcases and offals of cattle and pigs does not require amendment.

(2) Additional attention will require to be given to the conveyance of infection from cows to man, and to the question how far such infection once introduced is able to spread. We are already giving some attention to this question from the Etiological point of view.

(3) The spread of Tuberculosis is unquestionably influenced by nutrition, and the question how far it is desirable and practicable for the Sanitary Authority to take up the prevention of Phthisis—by a limited amount of assistance given to families invaded and impoverished by Tuberculosis—has become more insistent because its importance is increasingly manifest.

(4) The isolation of consumptives is a powerful means of combating Tuberculosis. More than in any other way, it is for advanced cases of the disease that assistance of this kind is needed at the present time. The day may come when only sanatoria are required, but that day appears to be not very near. Just now, in spite of the large number of beds allocated to Phthisis of a more or less advanced type in the Crossley and Bowdon Sanatoria, in the Union Hospitals, at Clayton, and in Mr. Crossley's Home of Peace, the pressure is constant and urgent for more accommodation for advanced cases. It is not suggested that the Clayton experiment should be abandoned, but that a new home should be opened. It is, however, needful that any such home should have an abundant supply of pure water and adequate drainage. In all wards used for the reception of cases of Phthisis, systematic instruction should be given in personal precautions.

(5) The greatest obstacle to the successful treatment of Phthisis is the difficulty of getting persons to enter hospital, or to seek the necessary medical aid at an early period. There can be little doubt that this reluctance will not be overcome unless the family of the consumptive can be guaranteed as regards nutrition during the absence of the sufferer, when such sufferer is the bread-winner. No doubt any such assistance would have to be carefully limited, and given only under stringent conditions.

(6) More attention will have to be given to the Tuberculoses of childhood, and to the means of averting or curing them.

(7) Additional legislation should be obtained for dealing with the habit of expectorating in all places of common resort, including workshops, public-houses, etc. Such powers exist to some extent at present if it be recognised that the presence of expectorated matter constitutes a nuisance dangerous to health of the most obnoxious kind.

(8) The work of instruction should be pursued more energetically on existing lines. Meanwhile, moderate progress is being made, which, however, is largely due to the improved circumstances of the working classes.

MILK AND TUBERCULOSIS.

I beg to submit my report on the work done during the year 1906.

The duties I was appointed to carry out are—(1) Inspection of Manchester Cowsheds and Dairies as to compliance with the Manchester Regulations made under the Dairies, Cowsheds, and Milkshops Order; (2) to act as Veterinary Inspector in the working of the Milk Clauses contained in the Manchester General Powers Act, 1899.

Manchester Cowsheds.

These number 203 on 108 farmsteads, and house about 1,800 cows. These numbers include the cowsheds in the Withington district, and throughout the report, when mention is made of the City, the district of Withington is included.

In the course of the regular inspection of the City farms, 604 visits have been paid and 1,069 inspections of cowsheds made. The total number of inspections of cows is 10,998.

All these totals, of course, show that a number of visits have been paid to most farms, and, as has already been stated, there is no attempt made to keep up anything like an even number of visits to each farm, greater attention being devoted to those who require it.

I cannot report that any material progress has been made during the year towards the more scientific carrying out of the methods of the dairy. There is no doubt, however, that some interest is being awakened, at any rate among those farmers who live in the better class neighbourhoods, although it is too much to expect that any radical change will be forthwith carried out.

I am informed, and moreover can bear personal witness to the fact, that it is becoming more common for the heads of households, etc., to whom milk is sold to personally visit and see for themselves the conditions under which their milk is produced; and although the public may not be educated to model conditions, this is a considerable factor in obtaining cleanliness.

So far as the prevailing conditions are concerned the year has not been an unsatisfactory one, and I have had little cause for complaint. As regards cleanliness, the cowsheds have been very satisfactory. Irritating little lapses on the part of the farmer or his servants are, of course, constantly cropping up, but as a rule they are not serious, and are usually due to unavoidable causes, which need not be enumerated. Personal admonition is quite sufficient to effect a return to the higher standard of conditions which has been set up. Systematic disinfection of the cowsheds twice yearly is now becoming somewhat more common, the chlorinated lime solution being used just prior to the white-washing in spring and autumn. It is, however, a difficult matter to convince all farmers of the utility of such a measure.

An endeavour has been made to induce farmers who possess sufficient accommodation to remove all parturient animals to another building until at least a week has elapsed after normal parturition, or, in those cases in which there is prolonged etention of the fœtal membranes, until such time as a normal state of health has been regained. There are, however, few farmers who possess sufficient accommodation for such isolation of sick or parturient

animals. It is a fact that not a very great number of cows are calved in the City cowsheds, but separate accommodation should be provided, and if not required for parturition would be available in case of illness.

The question of the cleanliness of the milkers is one to which a considerable amount of attention has been devoted, and the state of affairs is one which is very difficult to deal with. Some two years ago, acting upon a suggestion of the Medical Officer of Health that farmers be urged to provide proper smocks for milking, I proceeded to the farmers, and pointed out to them that smocks should be provided, and in a fair number of cases the smocks were obtained, and for the first few months were regularly worn by all the milkers at the few farms where these garments had been provided. It is, however, no easy matter for even the employers to make the milkers wear these smocks, as men who can milk are not easy to obtain, and employers do not care to run the risk of losing men.

The work of reconstruction of buildings which do not comply with the sanitary requirements has been carried on. The insanitary cowsheds at three farms have been entirely altered. At two of these farms, which are on the property of the Corporation, the alterations have been extensive, and I would like to draw attention to these alterations.

In a previous report, I stated that in carrying out reconstruction of old buildings or in the construction of new ones for the housing of dairy cattle, it was necessary to observe three requirements in the laying out of the floor if the new building was to fulfil the conditions as to cleanliness, and I may be pardoned if I enumerate these again—(1) that the stall shall not be too long; (2) that there be some obstruction (preferably rails) in front which may prevent the animal reaching over into the feeding passage; (3) that the drop from the back of the stall be of sufficient height and width to accommodate the large quantity of solid excreta.

All these requirements have been carried out in the two Corporation farms mentioned, and the results obtained are satisfactory in every way, not only to the Inspector, but to the farmers themselves.

There is no comparison in the cleanliness of the cattle, and very little is required to keep them clean; they always lie well on the bed, and animals newly added to the herd, who have been in the habit of lying back at the full length of the chain, so that the hind parts are almost constantly in dung, soon learn that it is too uncomfortable to do, and so lie clean.

The fears expressed by the farmers and others that a drop of such a height behind the cows would lead to injuries to the hind limbs have not been justified, and no single injury has occurred.

These buildings will be very useful, as to some extent it is necessary to consult the farmer's convenience in planning out alterations to new buildings. Hitherto it has been extremely difficult to convince cow-keepers that there was no danger attaching to these arrangements, while now it will be possible for them to visit personally and see the places for themselves. Already large numbers of farmers and others have visited these buildings.

I have dealt in a somewhat lengthy manner with the detail of building, but do so so that I may protest against the indiscriminate manner in which, without any recognised method, reconstruction of buildings is carried out in some outside districts. Alterations which I have seen in many instances render it more difficult than formerly to keep cows clean. It may be stated, of course, that any reconstruction is better than none at all, but judging by some alterations which I have seen this is open to question.

In addition to these alterations to buildings, a small alteration in the shape of an extension of one cowshed to provide increased accommodation has been sanctioned. One farm has been closed, not by any direct action of the authority; but the farmer left, as he knew that the buildings were insanitary, and would either have to be reconstructed or the keeping of milch cows discontinued.

I regret to again say that I can find no increase in the provision of suitable appliances for the cooling of milk. The public demand for the warm article is as large as ever, in fact I can safely say from my own knowledge that the demand is greater than the supply of naturally warm milk.

The methods of filtration or straining of milk are still elementary, the medium most generally in use being muslin. I have endeavoured to induce some farmers to provide more efficient appliances. These materials in common use will only arrest the coarsest particles of dirt, and, again, I am not satisfied that the cloths are always as clean as they might be.

Manchester Cows.

During the year, 10,998 examinations were made of the cows kept in the cowsheds within the City boundaries. The estimated number of cows housed within the City boundaries is 1,800.

The cows kept are good class animals, which milk well, and are likely to feed well for subsequent slaughter. Great care is exercised by the farmers in purchasing stocks, and none but fairly young cows are bought, as they recognise that it is to their advantage to keep animals which will satisfy the authorities.

The cleanliness of the cows has on the whole been well maintained, though really systematic grooming thoroughly carried out is not common, and the question of labour and time enters very largely into a farmer's consideration, however anxious he may be to attain the model standard of conditions which is being constantly urged upon him.

It is satisfactory to report that no case of tuberculosis of the udder was discovered in any of the cows in the City during the year.

The Manchester Milk Clauses.

There have been no changes in the methods adopted in the working of the Milk Clauses of the Manchester General Powers Act, 1899.

Samples of milk are taken at the Manchester and other railway stations, or elsewhere within the City, by the Food and Drug Inspectors. These are submitted to Professor Delépine for bacteriological examination. All samples reported by him as having been found to cause tuberculosis are followed to their source at the farm by the Medical Officer of Health (or his representative) and the Veterinary Surgeon.

The Veterinary Surgeon examines all the milking cows on the farm, and takes samples of milk from cows having diseased or suspicious udders. The special samples are taken in sterilised bottles provided by Professor Delépine, and every care is taken to avoid extraneous infection. These samples are, in turn, submitted to Professor Delépine for bacteriological examination, and in this way the fact of a cow having tuberculosis of the udder is definitely proved. Samples from cows found by clinical examination to have diseased or suspicious udders, without previous station samples, are examined in the same manner.

In all cases a control sample is taken, so as to ensure that the examination has been satisfactory, and that every source of infection has been removed.

Tuberculous Milk.

It has been stated earlier that during the year 10,998 inspections were made of cows housed within the City boundaries, and no cow suffering from Tuberculosis of the udder was found.

During the year 677 samples of mixed milk have been taken by the Food and Drug Inspectors in connection with Tuberculosis, and the number of farmers represented in this total is 542.

Of these 542 farmers, 290 reside in Cheshire, and 25 of them (8·6 per cent.) sent tuberculous milk; 92 live in Derbyshire, and 6 of them (6·5 per cent.) sent tuberculous milk; 86 live in Staffordshire, and 8 of them (9·3 per cent.) sent tuberculous milk; 50 live in Lancashire, and 2 of them (4·00 per cent.) sent tuberculous milk; 16 of them live in Yorkshire, from which county no tuberculous milk was received; 8 of them live in Shropshire, and 1 of them (12·5 per cent.) sent tuberculous milk.

It will thus be seen that from 542 farms a total of 677 samples of milk were obtained ; of this total, 649 samples were taken at the railway stations, and the remaining 29 were obtained from farmers whose milk is brought into the City by cart. These numbers show that in a number of cases more than one sample of a farmer's milk has been obtained. Every effort is made to avoid unnecessary duplication of samples taken by the Inspectors, and, further, every effort is made to cover as much of the area from which the Manchester milk is derived as possible. Registers are kept in the office by Mr. Lock, who keeps a careful watch upon the taking of samples, and from time to time lists are issued to the Inspectors with instructions to obtain certain milks. From other sources new names are obtained, and in these cases the names are at once handed on to the Inspectors, who at the same time have a general instruction to keep a careful look-out for new sources of supply, and to obtain samples from any new farmers they may discover.

From returns supplied, chiefly by farmers themselves, the estimated number of cows at the 542 farms from which the milk was subjected to examination was 12,918, being an average of nearly 24 cows per farm. During the year the udders of 2,855 cows at the country farms have been examined for tuberculosis. Of the milk tested by Professor Delépine from 542 farms, 42 were found to cause tuberculosis, giving a percentage of 7·7 farms sending tuberculous milk.

As a result of following up the tuberculous mixed samples, 30 cows were found and proved to be suffering from tuberculosis of the udder ; 21 of these cows were either slaughtered in my presence, or I examined the carcase soon after ; in 8 cases the entire carcase was found to be fit for food ; in 3 instances half the carcase was passed ; and in the remaining 10 cases the entire carcase was condemned. In the remaining 9 cases the disposal of the cows could not always be ascertained, although in three of these cases the farmers replied to the letters of enquiry, giving the names of the persons to whom the cows had been sold ; but when these buyers were written to, no reply was forthcoming, so that it is difficult to say what became of these cows.

If hearsay evidence can be relied on, and the source of my information is usually reliable, then it can be stated that there must be considerable traffic in such animals from the large dairy districts—such as Cheshire, Derbyshire, Staffordshire—to the counties further south, such as Norfolk and the

surrounding cattle-feeding districts. I do not mean to say that this is the only class of animals which go, but they are said to be included among the dry barren cows which are sent to those districts.

In addition to the above 30 cows found as the result of following up tuberculous station samples, one cow notified was proved to have tuberculosis of the udder. She was subsequently slaughtered under my inspection, and the carcase was found to be unfit for food

Thus, during the year, 31 cows were proved to have tuberculosis of the udder; this leaves, of course, a margin of cases in which no cows were found, the correctness of the clinical examination being always confirmed by a mixed control sample; no case being considered closed until there is no further evidence of infection.

One prosecution was instituted during the year under the Milk Clause for failure to notify to the Medical Officer of Health the presence of a cow in the herd showing marked signs of disease in the udder. The case was heard at the City Police Court, and a fine of 20s. and costs, and £5 5s. extra cost imposed. In this case the cow was removed from the herd immediately after the discovery by me, and, as stated by the farmer, was sold for the sum of ten shillings. I afterwards ascertained that the individual who purchased this cow was a man well known to be a dealer in slink cattle, he being, in fact, caught soon after and sentenced to three months' imprisonment. These men are to a very great extent responsible for the fact that in some cases no history can be gleaned of the subsequent disposal of condemned cows. They are, as a rule, extremely well posted as to the movements of men like myself, and do not allow much time to elapse after my visits before they are at the farms trying to purchase *all* the cows from which samples are taken for examination. They point out to the farmers that because samples are taken from particular cows they are sure to be condemned, and in this way make purchases of many fairly good animals at slink prices. I find it necessary to always warn farmers that it does not follow because a sample of milk is taken from a particular cow that she must of necessity be suffering from tuberculosis of the udder, and that in no case should he sell any cow through fear of the result of the examination, there being many samples collected from udders to which only the slightest suspicion can be attached. I should state that where I have reasonable grounds after clinical examination for forming a definite diagnosis of tuberculosis of the udder this is always intimated to the farmers, with a request that no further milk be sent from that animal to Manchester until, at any rate, the result of the bacteriological examination is known.

It has been usual to insert a table showing the percentage of tuberculous milk sent into Manchester. The figures for 1906 have been added, and the table is again inserted.

TABLE I.

YEAR	Number of farmers' milk tested during the year	Total number found to cause Tuberculosis in the experimental animal	Percentage of farmers sending Tuberculous milk	Percentage of farmers from EACH COUNTY whose milk was found to cause Tuberculosis.					
				Cheshire	Derbyshire	Staffordshire	Shropshire	Lancashire	Yorkshire
1901	272	27	9·9	10·46	9·23	8·00	10·00	...	...
1902	345	36	10·4	12·72	8·65	4·01	...	8·31	...
1903	329	45	13·6	14·76	9·58	15·15	40·00	...	...
1904	318	29	9·1	11·17	6·02	...	...	7·14	25·00
1905	565	47	8·3	10·26	6·00	6·38	...	2·98	12·50
1906	542	42	7·7	8·6	6·5	9·3	12·5	4·0	...

There is no need for any extended comment on the figures in this table. The figures for the year 1906 show a slight decrease on those of the previous year, a decrease which has been progressive for the past three years. When considering the figures for each county, it will be seen that the figures for the county of Stafford have risen from 6·38 in the previous year to 9·3, and the latter percentage is on a larger number of farmers; in fact, there would seem to be an increasing quantity of milk consigned to Manchester from this county.

I am afraid I cannot report any marked progress upon the previous year in the conditions prevailing in the surrounding areas from which the Manchester milk supply is derived. Outside the county of Cheshire there is little or no effort made to carry out the requirements of the Dairies, Cowsheds, and Milkshops Orders, and even in Cheshire the administrative measures under this Order are only partially carried out—in fact in at least one Cheshire district there is certainly nothing done.

In the Bucklow Rural District, for example, a fair number of buildings have been dealt with, and reconstruction has been carried out; but in many instances, as I have already mentioned earlier in my report, these reconstructions do not effect the improvement expected,.

I am, however, pleased to say that so far as cleanliness is concerned, there is a definite and distinct effort on the part of the farmers to improve things; the cows are cleaner, the buildings are cleaner, and, taken on the whole, I think there is some improvement in the cleanliness of the milkers—at any rate, so far as the washing of the hands prior to commencing to milk is concerned. I

do not, however, lay any stress on this latter point, as it may be only due to the fact that it is not likely that they would neglect such precautions prior to milking in my presence. The milkers should be compelled to wear clean over-clothing, which should be provided by the farmer.

It is, however, extraordinary what an amount of dirt a farm hand will manage to induce to fall into the milk, even though he may be milking an apparently clean cow. To start with, many are most unnecessarily rough and clumsy in their handling of the animals. At only one farm during the year did I see a female milker, and there was no doubt that the comparative cleanliness of her milking was most marked.

The cows examined have on the whole been fairly satisfactory, and there is a steady improvement in the cattle kept. More trouble is taken in the selection of the animals, and undoubtedly they are younger. The milking life is not, on the whole, so long as it used to be. The cows with either one or two "deaf" quarters, which used to be so commonly seen in dairy herds, have now almost disappeared. It does not follow that these udders were all diseased, as in a great many instances the causes of suspension of function in one or more quarters were certainly accidental. It is a striking fact that such cows if seen are mostly confined to farms where cheese-making is the chief business. During the suspension of cheese-making in the three or four winter months, milk from many of these farms is sent to town, and an experienced Inspector on visiting such a farm need not be told that milk-selling is only a temporary business. There is no evidence of that exercise of care in the selection of the animals which is evident at most of the farms whose sole business is the sale of milk. These farms should certainly receive attention from the local or county authorities, although the view of many seems to be that because they make cheese they should not be under the same supervision as other dairy farmers. It is not my province to discuss the possibility of infection from cheese, but I would point out that stock reared under the conditions prevalent at many of these farms are likely to be seriously affected with such a disease as tuberculosis.

The question of diagnosis of tuberculosis of the udder has been discussed in previous reports, and the difficulties of diagnosis tend to increase, at any rate, to the casual visitor who sees the stock for the first time. There can be little doubt, however, that the person who should earliest become suspicious of an animal is the man who is always there, and has every opportunity of becoming aware of even the slightest change. It is a practice of mine always, if possible, to collect a sample of milk from a particular cow myself, or if not doing so to watch carefully the person who is doing so, it being quite easy for an expert milker to exclude milk from a suspicious quarter, particularly if the suspicion

be directed to the fore-quarters. It is often found also that a milker will state that no milk can be obtained from particular teats. These statements are, of course, never accepted until proved personally.

I am pleased to be able to state that in certain districts farmers have entered into contracts with their veterinary advisers to inspect their herds at stated intervals throughout the year. This practice is confined chiefly to districts adjacent to Manchester, such as Mobberley, Wilmslow, Alderley, but it is one which should extend. One of the disadvantages is, of course, that in the event of the discovery of diseased or suspicious udders the advice given is merely to get rid of them, and it is not known where they go to. The farmers who make these contracts have the impression that they will in the event of any proceedings, be able to shield themselves by pleading this provision of supervision, but it has been pointed out to them that because a veterinary surgeon may visit and examine a herd, say three or four times a year, it does not relieve the farmer of any responsibility, and is no excuse for want of vigilance on his part.

I have continued advising farmers to carry out disinfection of their cowsheds, and quite a number of them do so now as a routine measure.

The disposal or storage of manure at the country farms requires considerable attention. The usual arrangement, of course, is to have a large unformed midden-stead occupying the centre of the quadrangle, formed by the farm buildings and farmhouse. Very often also, the liquid manure is drained into this same midden for the purpose of soaking into the more solid manure. There is no doubt that for convenience the arrangement is a good one, but on no other grounds can it be approved. It is undoubtedly a difficult question to advise on, and whatever accommodation might be ultimately provided, it would not have to be very far away from the farm buildings.

I cannot report any improvement in the conditions under which the cooling of milk is carried out. The apparatus seems always to be fixed in the most convenient situation to catch all the dirt and dust. Even if fixed inside a building, the place is used often as a washhouse, store for seeds, implements, etc.

The inspection as to cleanliness of the railway milk vans has been regularly carried out.

Tuberculin Test.

The table completed with the figures showing the results of the application of the tuberculin test to the cows from which the milk is supplied to Monsall and Clayton Hospitals is inserted. The figures speak for themselves, and show that the work of keeping a herd free from Tuberculosis is being successfully carried on.

TABLE II.

Below is presented a table showing the actual results of each application of the test:—

Date of Test	Total Number Tested	MILKING HERD. Animals having been previously tested				PROBATIONARY ANIMALS. Animals not previously tested, but purchased subject to passing the test				Total Number of Animals Passing Test
		Number Tested	Number Re-acting	Number Passed	Doubtful Re-actions	Number Tested	Number Re-acting	Number Passed	Doubtful Re-actions	
October, 1902.....	101	91	11	80	0	10	4	6	0	86
April, 1903.....	108	88	3	85	0	20	6	13	1	98
October, 1903.....	108	98	1	96	1	10	4	5	1	101
April, 1904.....	103	76	0	76	0	27	10	17	0	93
October, 1904.....	103	85	0	84	*1	18	4	13	1	97
April, 1905.....	102	87	0	87	0	15	4	11	0	98
October, 1905	98	84	0	84	0	14	5	9	0	93
April, 1906.....	107	91	0	91	0	16	6	10	0	101
October, 1906	102	73	1	72	0	28	7	21	0	94

* Animal tested, but developed Bronchitis during test.

Details of Individual Cases.

It is not proposed to give in detail the disposal of each case of tuberculosis of the udder, but only of those cases presenting features of interest.

Case 266.—This cow was found as the result of a previous infected mixed sample.

The cow in question was one of a herd of 26, housed under most insanitary conditions, and a letter was sent by the Medical Officer of Health pointing out the insanitary conditions reported at the farm.

On March 14th, 1907, when I visited this farm to witness the slaughter of a condemned cow, the farmer stated he had decided to carry out some alterations himself. These consisted chiefly in the provision of light and good flooring; proposals as to ventilation and drainage were also asked for, and submitted.

On April 28th, 1907, when this farm was again visited, the alterations had been carried out, effecting a great improvement.

Case 267.—This cow was also found when following up to the farm a tuberculous station sample.

There were 38 cows on the farm housed in a new building not quite completed at time of visit in February. The cows were all in very poor condition, and appeared very badly nourished, and were not giving much milk. The farmer pointed out that he had had a fire, and all his cowsheds had been burned down, with the result that the cows had had to stay out in the fields all winter, having no shelter at all, as he stated that he could not even afford them temporary shelter until something permanent could be erected.

A liberal diet was advised, which the farmer promised to carry out, but it is doubtful whether he would do so. Doubtless the exposure may have been responsible for some of the want of condition, but want of good food (which the farmer could not afford) seemed, in my opinion, to be the chief cause.

Case 267.—These two cows were found as the result of following up a previously infected sample.

This case illustrates what I have said earlier about the methods of some of the slink cattle dealers.

The farm is only a small one, and in the occupation of a young man whose knowledge of cows was only slight, he having been a postman in town, and having found it necessary on account of his health to get out into the country.

There were only 8 cows on the farm at the time of my visit, and I was informed by the farmer that about six weeks previous to my visit one of these low-class dealers called and advised him to exchange two of his cows, which were nearly dry, for these two which he stated were newly calven and in full milk. The

farmer did so, with the result that at my visit I found both cows suffering from tuberculosis of the udder. The facts of the case as to the transactions with the dealer were confirmed on enquiry. One of the cows certainly had disease of the udder, which should have been evident to an experienced person. This man discontinued sending milk to the City.

Case 277.—This cow was found as the result of following up a tuberculous station sample.

On visiting the farmer whose name we had got, and examining the herd, no animal showing signs of tuberculosis was found, but after enquiry it was found that the farmer also purchased milk from two other farms in the neighbourhood. On visiting these farms the farmers raised objections to my inspection, but ultimately consented, and it was at one of these farms that the cow was found.

She was ultimately slaughtered in my presence, the carcase being unfit for food.

Case 278.—On the discovery of this cow the Medical Officer of Health wrote as usual to the farmer, who replied that the cow had been sold, mentioning the name of a dealer. This dealer was also written to, but did not reply.

Cases 284 and 285.—In both these cases no cow was found at the first visit, and it was only after the control sample had been proved to be still capable of producing tuberculosis that the cows were found.

Case 303.—In this case the cow was discovered as usual after the mixed milk had been proved tuberculous.

I pointed out to the farmer at the time of my visit that in addition to the cow suffering from tuberculosis of the udder there was another cow showing marked clinical tuberculosis of the lungs. He stated that his Veterinary Surgeon had advised him that she had not got tuberculosis, but was suffering from acute rheumatism. He stated, however, that, when I came to see the first cow slaughtered, he would take my advice and also have the old cow slaughtered.

About a month later I saw both cows slaughtered; both were extensively tuberculous, and were sent to the knackers.

Case 310.—When visiting this farm in connection with the infected station sample from the farm, I advised the farmer to make representations to his landlord with regard to the state of his buildings, which, while being fairly well kept, were practically devoid of light.

On visiting the farm later on in the year, I found that considerable improvement had been effected; new windows and floors had been put in, with additional accommodation for ten more cows.

These alterations, whilst not by any means converting the buildings into model cowsheds, improved the original condition of matters very materially.

The following table of samples submitted in connection with the Manchester Milk Clauses summarises the work of the year :—

1906.

Number of specimens mixed milk taken at the station		648	
Number of specimens mixed milk elsewhere		29	
Number of each found to contain tubercular infection	Station 42 / Elsewhere 0		In addition, 22 control samples were taken at the stations, of which 7 were proved capable of causing tuberculosis.
Number of farms visited in consequence		44	Additional 6 visited as result of notification or otherwise.
Number of specimens taken from individual cows as result of following up station and other samples		122	And 2 mixed samples.
Number of milks from individual cows proved to be tuberculous out of those given in the preceding column		30	
Number of udders proved to contain tuberculous lesions		31	
Number of milks taken from individual cows as the result of *notification* or *otherwise* than owing to the presence of tubercle bacilli in mixed milk		7	
Number of udders in last column shown to be tuberculous by bacteriological examination		2	
Total number of specimens submitted for examination		830	

J. W. Brittlebank,
M.R.C.V.S., D.V.S.M.

THE FACTORY AND WORKSHOP ACT, 1901.

I beg to submit a statement of work done under this Act on the Form issued by the Home Office:—

FACTORIES, WORKSHOPS, LAUNDRIES, WORKPLACES, AND HOMEWORK.

1.—INSPECTION.

Including Inspections made by Sanitary Inspectors or Inspectors of Nuisances.

Premises	Number of		
	Inspections	Written Notices	Prosecutions
Factories (including Factory Laundries)			
Workshops (including Workshop Laundries) ...	16261	452	4
Workplaces			
Homeworkers' Premises	3574	22	1
Total	19835	474	5

2.—DEFECTS FOUND.

Particulars	Number of Defects			No of Prosecutions
	Found	Remedied	Referred to H.M. Inspector	
Nuisances under the Public Health Acts:—				
Want of cleanliness	58	58	...	...
Want of ventilation	18	18	...	...
Overcrowding	6	6	...	...
Want of drainage of floors	11	11	...	...
Other nuisances	133	133	...	2
Sanitary accommodations—				
Insufficient	47	8	...	...
Unsuitable or defective...	88	7	...	...
Not separate for sexes	28	4	...	...
Offences under the Factory and Workshop Act:—				
Illegal occupation of underground bakehouse (S. 101)	...	...	...	...
Breach of special sanitary requirements for bakehouses (SS. 97 to 100) ...	...	...	...	...
Failure as regard lists of outworkers (S. 107)	...	...	...	19
Giving out work to be done in premises which are unwholesome (S. 108)	...	...	...	...
Giving out work to be done in premises which are infected (S. 110) ...	21	21	...	...
Allowing wearing apparel to be made in premises infected by Scarlet Fever or Smallpox (S. 109)	14	14	...	...
Other offences	1013	1013	...	2
Total	1437	1293	328	23

3.—Other Matters.

Class	Number
Matters notified to H.M. Inspectors of Factories :—	
Failure to affix Abstract of the Factory and Workshop Act (S. 133)	328
Action taken in matters referred by H.M. Inspectors as remediable under the Public Health Acts, but not under the Factory Act (S. 5)—	
Notified by H.M. Inspector	104
Reports (of action taken) sent to H.M. Inspectors	152
Other	48
Underground Bakehouses (S. 101) :—	
In use during 1905	56
Certificates granted in 1905	16
Certificates granted in 1906	1
In use at the end of 1906	56

Homework :—	Number of Lists	Number of Outworkers
Lists of Outworkers (S. 107):—		
Lists received	914	8764
Addresses of outworkers forwarded to other Authorities		1372
Addresses of outworkers received from other Authorities		179

Homework in unwholesome or infected premises :—	Wearing Apparel	Other
Notices prohibiting homework in unwholesome premises (S. 108)	...	...
Cases of infectious disease notified in homeworkers' premises	21	...
Orders prohibiting homework in infected premises (S. 110)	21	...

Workshops on the Register (S. 131) at the end of 1904 :—	
Workshops	4597
Bakehouses	493
Total number of Workshops on Register	5090

Bakehouses.

There has been no action taken during the year as regards cellar bakehouses, all these having been supplied with a certificate that they are satisfactory.

Bakehouses Closed during the Year 1906.

Situation	Situation
Above Ground	*Above Ground*
27, Chancery Lane, Ardwick.	100, Great Jackson Street, Hulme
3, Chapel Place, Hulme.	230, Hyde Road, Ardwick.
49, Camp Street, Deansgate.	77, Moss Lane West.
32, Downing Street.	76, Princess Road.
17, Elgar Street, Longsight.	288, Stretford Road.
93, Embden Street, Hulme.	

The following table shows the amount of work done since the commencement of operations in 1894 :—

Year	Bakehouses Altered	Bakehouses Closed
1894	3	3
1895	16	12
1896	28	19
1897	22	31
1898	18	17
1899	12	18
1900	8	13
1901	3	17
1902	0	19
1903	2	16
1904	73	106
1905	39	61
1906	1	11
	225	343
	Total, 568.	

The alterations here mentioned have been in all cases considerable, and were, for the most part, carried out according to careful specifications drawn up in the City Surveyor's Department to comply with the requirements of the Medical Officer of Health.

One bakehouse certificate has been granted during the year 1906.

Altogether, since 1894, 225 bakehouses have been altered and 343 have been closed.

The new bakehouses erected during the year 1906 are as follows:—

Statement of the Bakehouses approved by the Improvement and Buildings Committee, and completed during the year 1906, *numbering* 5.

Situation	Owner	Date of Completion
Moston Lane, Moston ..	W. Schofield	24th November, 1905
Rear of No. 9, Stockport Road, Ardwick	W. Whiteley	6th December, 1905
Booth Street East, Chorlton-on-Medlock	Mrs. P. Sykes	31st March, 1906
10, Beattie Street, Ardwick	W. Jones	5th June, 1906
22, Bury New Road, Cheetham	A. Silverstone	24th October, 1906

HOUSING OF THE WORKING CLASSES.

It cannot be doubted that the conditions of housing exercise a powerful influence on the health of the inhabitants of all our large cities.

These, however, are not the only influences which affect powerfully the health of the people.

The climate and soil may exert a very great effect. In this City the subsoil, for the most part, consists of boulder clay. Over the districts of Hulme and Ardwick, and in the part of the City traversed by Deansgate, the subsoil consists of gravels and sands. As measured by death-rate, the latter portions are, assuredly, not healthier than the former.

Again, over considerable patches, houses were formerly erected on made ground, a practice which should be altogether abandoned unless the new soil is composed of non-injurious inorganic materials.

Let us consider what effect these conditions would have on the sanitary state of houses.

Let it be observed that up to the establishment of building bye-laws, in 1890, houses were generally constructed without the interposition of any damp-proof course. The consequence is that, given a damp soil in contact with the walls of these houses, the moisture passes upwards into the walls—a fact to which the damp condition of empty houses amply testifies, while the walls of inhabited houses also are frequently visibly damp near the ground level.

In addition, in most of the older houses there is no surface impervious to moisture separating the base of the site from the dwelling.

Let us now suppose that by any means the soil in the immediate neighbourhood of houses has become impregnated with organic filth.

If the houses are built on clay, it is probable that none of this filth will penetrate into the interior of the site.

If, however, such filth has entered the surface, and if, as often happens, from defects in pipes, from broken flags, or from exposed surfaces, rain and other waters enter freely the surface external to the house, there will generally be a sufficient layer of porous material on the surface to conduct such filth to the walls, and so to the interior of the dwellings. This danger will be increased in those cases in which the subsoil consists of sand or gravel, since it is evident that in this case the organic filth may penetrate over the whole of the interior of the site.

The disadvantage, if it be one, of clay is that it retains the moisture with which it has been impregnated, and parts with it slowly, so that the walls are still drawing in moisture even in warm and dry weather.

Soil made with impure material shares in the disadvantages of both kinds of subsoil, and, when moistened, becomes the seat of injurious growths of fungi, besides giving off deleterious gases.

From these considerations we deduce :—

1. The necessity of having sound drainage, especially in the immediate neighbourhood of houses, and in the upper layers of the soil.

2. The great importance of maintaining an unbroken and impervious surface in the neighbourhood of houses, more especially in the crowded and pervious district of Hulme.

3. The necessity of preventing the backing up of liquids from sewers into the basements of houses or into the subsoil.

4. The protection of the subsoil from the entrance of liquid filth, as from pail-closets, middens, receptacles for horse manure, and so forth.

It is sufficiently manifest that this most necessary condition for a healthy house is grievously broken by the pail-closets, and by many of the receptacles for horse manure.

As regards pail-closets and middens, the only remedy is their replacement by water-closets as rapidly as possible consistently with efficient workmanship and with due regard to any alterations in insanitary dwellings, and to any reconstruction of drainage, which may be imperatively called for

It is evident that if the surfaces near houses were rendered, throughout, impervious; if all pail-closets and middens were replaced by good water-closets; if drains were, throughout, truly and well laid and jointed; if the sewers were so constructed as in no case to permit of the backing of sewage into the soil, then, so far as concerns houses built on either sand or clay, the defective conditions of building which formerly held would be counteracted, and the great evil of damp and contaminated houses would be removed. At the same time, necessary structural alterations of insanitary dwellings have to be considered.

There are, however, other objections against pail-closets and middens no less strong in point of health than the pollution of the subsoil. There is no doubt that both one and the other serve as the breeding grounds of flies—this statement, in the case of pail-closets, applying to the recess in which they stand rather than to the pails themselves.

There is very strong reason for thinking that Summer Diarrhœa is propagated by flies, which gather in the poorer houses in incredible numbers, and haunting excreta, as they do, must contaminate food.

The present mode of collecting ashes is altogether objectionable. The wooden boxes are often receptacles for liquid filth, and standing outside the yards, as they do, are not amenable to control.

There is little doubt that, if pail-closets and middens were replaced by water-closets; if domestic refuse were suitably stored in covered metal receptacles; if horse manure were properly stored; and if persons producing animal or vegetable refuse were compelled to keep it in a proper manner, and to remove it at sufficiently short intervals, the plague of flies would be much reduced, and a great diminution in infectious disease would result.

All these are sanitary requirements which should be attended to for other reasons. But, undoubtedly, the one named is exceedingly important.

Another potent cause of ill-health in Manchester is deficiency of light.

The percentage of total sunshine available which penetrates into the City is lower than in any other large centre. Not only do the inhabitants suffer from the smoke produced by their own houses and factories, but from various directions—West, North, East, and South-East—they get the smoke of their neighbours.

The excessive deprivation of sunshine which results must be injurious to health, and is, moreover, an index of atmospheric impurities which are unquestionably injurious. These, in their turn, give rise to frequent fogs, during which pulmonary affections are caused, often of a fatal character.

There does not appear to be any immediate hope of effectual improvement. One suggestion which seems to touch the matter is that, instead of coal, gas manufactured at the collieries, and brought in pipes into the town, might be used for fuel and for power.

If this be, indeed, practicable, it has not so far been viewed with favour. So far as house fires are concerned, the same end might be obtained by the compulsory use of fireplaces so constructed as to consume their own smoke.

Other factors are rainfall and temperature.

There is no doubt that the meteorological and the resulting telluric conditions exercise a profound influence on health. This is clearly shown by the manner in which the death-rate of the whole country varies from year to year, while the death-rates of its component parts undergo similar changes.

How far the high death-rates of Liverpool, Manchester, and other Lancashire towns enclosed within the sweep of the Pennine Range depend on meteorological conditions it is not easy to say. The south-west is the prevailing wind, and comes charged with moisture, with which it parts when it reaches the hills. The percentage of moisture in the atmosphere is thus generally high as compared with the amount of rainfall. Yet the rainfall in Manchester is high, and the number of days on which rain falls is also high.

These conditions are favourable to the persistence of infection outside the body.

They are not favourable to a high summer nor to a low winter temperature.

Yet Manchester gives the sensation of a cold place. Partly, this sensation may be due to the deprivation of light, partly to the dampness of the ground, and partly to the frequency with which clothing is wetted.

Both in Liverpool and in Manchester, but especially in the latter, the death-rate from chest diseases is high. It may be that the check imposed on the elimination of moisture by the skin reacts on the lungs. That the result is not a necessary result of the climate appears to be shown by the low death-rates prevailing in the suburbs of both cities.

The social circumstances of the inhabitants have much to do with the death-rate. A large section, not only of the wealthy merchants, but also of the better-off employees, live outside the boundaries of the City, which is chiefly inhabited by artizans and labourers, with their families, and by those who minister to their needs.

Much of the work carried on, both in the centre of the City and at the Docks, is irregular or intermittent. Hence there is an accumulation of the poorest class of labourer in the centre.

Here also are gathered the common lodging-houses, into which collects the residuum of the cotton area. The death-rate of the inhabitants of these houses is very high, and the diseases with which they are afflicted tend to be propagated in their vicinity.

In the centre of the City live the market porters, hawkers, organ grinders, flower sellers, paper vendors, warehouse porters, casual labourers, rag pickers, waste sorters, tobacco workers, and others who gather a precarious living from the fluctuating tastes of the community.

It is in the centre of the City that public-houses are to be found in greatest abundance. Here, to a much greater extent than elsewhere, is to be found *la misère*: want, ignorance, improvidence, squalor, and disease.

It is evident that the task before the sanitarian is one to be essayed with infinite patience and study, and that it is necessary to give due attention to social circumstances.

In particular districts it would be of much value to the Sanitary Authority if a detailed record were made of housing circumstances, and of the mode of occupation of houses, at one epoch.

Provision would be made in such a record for the entry of any action taken to improve the light or ventilation of houses, the surfaces, whether external or internal, the drainage, the state of repair, the condition as regards cleanliness, the mode of occupation, or any other fact of importance.

The record would give a complete account of the circumstances external to the house at the time of inspection, the amount of space front and rear, the drainage, ventilation, lighting, size of yard, size of passage, state of surfaces, closet accommodation, arrangements for the collection of refuse.

As regards the house itself the record would show the number and size of rooms, the state of repair generally, the condition as regards dampness, and as regards light, ventilation, and cleanliness.

The mode of occupation would be recorded, whether by one family, or by one family and a lodger or lodgers, or by more than one family. The sex and age of each person would be recorded. The manner of use of the different rooms would be stated. The occupation pursued by each person would be given. The amount of rent paid and of any sub-rents paid would be recorded.

The value of such a survey would lie in the insight which it would afford into the kind of accommodation required, the adequacy of existing provision to meet it, the possibility of making such provision, and the results, immediate and future, of any action which the Sanitary Committee might desire to take in the district.

In any case, complete records and maps should be made (1) of all sewerage and drainage work carried out, (2) of all closet alterations, and (3) of all housing action taken. (This last has been done in the City Surveyor's department, and in respect of closet alterations and drainage is being carried out by Mr. Stansfield.)

Have we, now, any means by which we may estimate the effects of insanitary dwellings on the people inhabiting them. If social conditions exercise, as they undoubtedly do, a powerful influence on the health of the people, are we not in some danger of ascribing to conditions of housing results which should be ascribed to entirely different circumstances. This is in some respects not the case. There can be no doubt at all that the conditions under which excreta and domestic refuse are collected over the greater part of the City are calculated to, and do, in fact, produce disease. There can be no doubt that the stagnation of air, and the deprivation of light which obtain in the rear of so many dwellings are only less destructive of health. There is also no doubt that the humid state of many dwellings is injurious to health. These are, however, external causes, and must be little less hurtful to the good than to the bad dwelling.

Have we any means of measuring the effects of internal circumstances of housing ?

One such essay was made in 1895, in conjunction with the City Surveyor.

It appeared that in back-to-back houses, differing from those around them but little as regards the character of their inhabitants, but in which, on the whole, ventilation was defective, the degree of crowding greater, and the provision of closets unfavourable to cleanliness, the death-rate was higher than in other dwellings. But the difference, though marked, was not so great as might have been expected.

It is, in fact, evident that social influences of a powerful order must be called into operation if the improvements made in the conditions of housing by the operations of the Sanitary Committee are to be maintained.

The average death-rate per annum in Oldham Road Block No. 2 was, for the three years 1900–2, 27·7 per 1000 of the population, as compared with 57·7 for the years 1888–90 in the corresponding area before it was cleared.

The change may seem a great one. One must remember, however, that the tenants of Corporation dwellings pay their rents, and that this alone makes the persons inhabiting these dwellings a selected class. In other respects, also, the class of inhabitants is altered. It is probable that young children are proportionately more numerous than amongst the previous inhabitants of the area.

The change in the death-rate of this area is, therefore, no measure of the improvement in health resulting from the changed conditions of housing as distinguished from those resulting from other causes.

Thus, even when the benefit is certain and unquestionable so far as the district is concerned, it is a benefit which cannot be determined by any simple mode of measurement. It is, of course, certain that the injury inflicted on health by the insanitary conditions formerly existing are not inflicted on those who now inhabit the tenements. But it is not certain how far these persons would have suffered from such conditions had they not had these tenements to resort to. That they would have so suffered is, however, certain. Then, also, the example of a large number of quiet, well-conducted families interposed into such a district is of considerable value. The question which one has always to consider is, what becomes of those persons who are not amenable to Corporation control? They find room somewhere, and a process of reshuffling takes place. Possibly they may make other districts more uncomfortable by their movements. But it is doubtful whether they can do much harm, and the aggregate result is good.

There are other reasons why we should not lay too much stress on the vital statistics of small areas, such as Oldham Road Block No. 2. A small population is necessarily fluctuating, and there is some uncertainty as to how far the deaths (which occur largely in institutions) represent the mortality which would normally occur in the block population.

Further, an outbreak of infectious disease in a block of tenements such as this might obscure for some years a great advance, and such limited incidences of disease are always liable to occur.

Another method by which we may approach this question is the study of the mortality in tenements of varying sizes. This has been effected by Dr. Chalmers for Glasgow.

The proportion of one-roomed tenements in Glasgow is very high, and the death-rate of the inhabitants of these is also conspicuously high.

It is, however, not very different from the death-rate of the occupants of two-roomed houses in Manchester. It is true that the latter are subject to special disabilities in the matter of closet accommodation.

Still, the proper conclusion would appear to be that both the one and the other groups represent the less fortunate portions of the community, and that their social circumstances other than housing take an important share in the production of the death-rate.

This is not to be taken to imply that, *cæteris paribus*, two rooms are not better than one. Other things are, however, not equal, as a smaller rent leaves more money available for food.

The questions raised are rather complicated. We must conclude, on the whole, that the mode of living in Glasgow is bad, even if the death-rate in that City is not higher than the death-rate in Manchester.

We have seen that no direct conclusions can be drawn in regard to housing from the vital statistics of particular districts, but it appears desirable to give some attention to the changes in the death-rate of the different sanitary districts in recent years, as these may throw some light on the question of housing, and, in any case, will give indications of any change which may be occurring.

The figures published in the Census returns of 1901 permitted of a study of the death-rates in each district for 10 years, which will be found in the Annual Report of the Medical Officer of Health for 1901.

In no single district do we observe a steady advance during the 10 years 1891–1900 sufficient to override the effect of an unfavourable year (pages 8 and 9). On the other hand, the average death-rates for the quinquennium 1896–1900 show an improvement over those for the years 1891–95—slight in the cases of the Manchester Township and South Manchester, greater for North Manchester.

As regards individual districts, the greatest improvement occurred in Ancoats, Cheetham, Blackley, Newton, Beswick, and West Gorton.

Improvement also occurred in the Central, Crumpsall, Bradford, Clayton, Ardwick, and Openshaw districts.

The greatest falling-off was seen in St. George's, Harpurhey, Moston, Bradford, and Rusholme. There was also slight falling-off in Hulme and Chorlton-on-Medlock.

The cases of Harpurhey, Moston, and Rusholme are sufficiently notable, as in these districts a large number of new houses had been erected during the ten years.

The most notable improvement had taken place in those districts in which new houses were not greatly in evidence. (See Report for 1901, p. 282.) This is a further illustration of the great share which social factors take in the production of the death-rate.

We may now compare the average death-rates during the years 1901–5 with those holding in the two previous quinquennia.

When we do so, we find that the improvement manifest in the previous quinquennium is continued for each division of the City, but is very much more pronounced. It is greatest in the Central division, next in South Manchester, and least in North Manchester. This is best seen from the percentage of improvement column in the table which follows. This, then, is a cardinal fact, and reverses the progresses shown in the previous quinquennium.

As well the magnitude as the distribution and general dispersion of this improvement arrests our attention. It would seem to indicate some general causes in operation.

It must always be remembered that, in searching for these causes, one is liable to overlook something of capital importance.

It is to be remembered that the position of Manchester among great towns has not materially altered during those five years, although the absolute improvement has been so great.

It may be, then, that the causes at work have been equally operative throughout England and Wales. As a matter of fact, the average annual death-rates in the same quinquennia have been for the whole country: 1891–1895, 18·7; 1896–1900, 17·7; 1901–1905, 16·0; and the percentage of improvement shown in the last quinquennium has been 9·55, while for Manchester it has been 12·13.

DEATH-RATES FROM THE UNDERMENTIONED DISTRICTS IN

STATISTICAL DIVISIONS		Average, 1891–1895	Average, 1896–1900	Average, 1901–1905	Percentage lowering or increase in 1896–1900 as compared with 1891–95; lowering marked +, increase —	Percentage lowering or increase in 1901–05 as compared with 1896–1900
	City of Manchester	**23·63**	**22·92**	**20·14**	**+ 1·78**	**+ 12·13**
I.	Manchester Township .	30·19	29·90	25·81	+ 0·98	+ 13·68
II.	North Manchester.....	18·69	17·92	16·40	+ 4·14	+ 8·49
III.	South Manchester	22·38	22·09	19·74	+ 1·03	+ 10·65
I.	Ancoats	30·93	29·76	25·98	+ 3·79	+ 12·72
	Central	31·18	30·77	27·60	+ 1·32	+ 10·31
	St. George's	29·08	29·84	24·82	— 2·61	+ 16·81
II.	Cheetham	14·94	14·16	12·89	+ 5·23	+ 8·98
	Crumpsall	15·64	15·31	13·59	+ 2·10	+ 11·25
	Blackley	19·78	16·12	16·29	+ 16·97	— 1·06
	Harpurhey	18·33	19·70	15·34	— 7·45	+ 22·12
	Moston	13·69	14·52	13·37	— 6·06	+ 7·92
	Newton	20·30	18·79	17·87	+ 7·42	+ 4·91
	Bradford	23·00	23·72	21·27	— 3·14	+ 10·33
	Beswick	21·06	19·54	20·30	+ 7·23	— 3·91
	Clayton	17·32	17·05	17·09	+ 1·56	— 0·25
III.	Ardwick	21·99	21·47	19·07	+ 2·39	+ 11·17
	Openshaw	21·90	21·44	19·21	+ 2·10	+ 10·59
	West Gorton	22·14	20·90	17·51	+ 5·58	+ 16·23
	Rusholme and Kirk....	15·85	16·25	16·16	— 2·50	+ 0·55
	Chorlton-upon-Medlock	21·28	21·40	19·45	— 5·42	+ 9·10
	Hulme	25·39	25·44	23·05	— 0·19	+ 9·40

It is possible, though unlikely, that a favourable succession of seasons is responsible.

A circumstance not to be overlooked has been the decline in the consumption of alcohol.

There has been a much greater resort on the part of the poor population, in recent years, to the Medical Charities.

Both of the two latter factors, but more especially the increasing resort to the Medical Charities, would to some extent account for the difference in favour of the poorer districts, which, on general grounds, we should not expect.

Nor must we overlook the advance which has been made in educating the poor in the principles of domestic hygiene.

The position of the labourer has also undergone a favourable change, and this may constitute an important element.

The influence of cycling on the health of the population is another factor not to be overlooked.

There are, then, many things to consider before we can credit improved housing with its share in the betterment.

The individual districts in which improvement has been greatest have been Ancoats, St. George's, Harpurhey, Bradford, and West Gorton.

With the exception of Harpurhey, these have been districts conspicuous by high death-rates.

With the exception of Ancoats, they are not conspicuous on account of the improvements effected in housing.

Harpurhey, indeed, has been largely extended, but we have already seen that this circumstance cannot be credited with the improvement, which is not manifested in such districts as Rusholme and Moston.

There have been no alterations in Bradford or West Gorton at all adequate to account for the great lowering of the death-rates.

It seems probable that social factors have been largely operative.

Even in Ancoats, ameliorative social efforts have been very marked.

Nevertheless, in Hulme also, marked progress has been made, and though it can only in part be ascribed to the improved conditions of housing, some of it may be so assigned.

This, however, can hardly be said so confidently of St. George's, which shows the greatest improvement of all.

The districts in which no advance is manifest, or the reverse is shown, are Blackley, Beswick, Clayton, and Rusholme.

Reverting to the death-rates in successive quinquennia of the different sanitary districts, these are liable to be altered by special outbreaks of disease, and the total advance made, or the reverse, may perhaps be best gathered by adding the percentages of gain and loss in successive quinquennia. It is true we may thus be adding the effects of different causes; but, on the other hand, disturbing factors are thus to some extent eliminated.

When we do this, we find that the aggregate result is to show the greatest percentage of gain in the central portions of the City, and then in North Manchester.

Of individual districts, the highest percentages of advance are seen in Ancoats and West Gorton.

But the percentages are high also in the following districts: St. George's, Cheetham, Harpurhey, and Blackley.

The gains are also great in the Central, Crumpsall, Newton, Ardwick, Openshaw, and Hulme districts.

In Bradford, Beswick, and Chorlton-on-Medlock the advance is relatively small.

In Moston and Clayton there is no advance.

In Rusholme there is retrogression.

It is scarcely to be anticipated that the rapid extension of artizan dwellings in sparsely populated districts such as Rusholme and Moston will lower the already low death-rate

There has, in fact, been in operation during the last ten years a strong movement outwards of the population, and the contention that the partial housing alterations of the Housing Sub-Committee need not be dreaded, as any temporary pressure caused by the demolition of particular dwellings would be relieved by such a movement outwards, appears to be justified by the facts.

This dispersal of the population is itself calculated to level the death-rates in different districts to some extent, with a general beneficial effect.

It may be confidently anticipated, however, that with the rapid replacement of middens in the outer ring by water-closets a still further reduction of the death-rate will occur, while other alterations will have a similar beneficent result in the more centrally placed districts.

At the same time, we must look to the education of the younger generation in cleanliness, thrift, domestic management, choice and cooking of foods, choice and management of clothing, physical development, mental and manual training, even more than to conditions of housing.

Yet, better conditions of housing are required to render it possible to carry out the principles which it is proposed to teach, besides giving a direct benefit to health.

It is of interest, in association with the changes in the death-rate which we have just traced, to see in what parts of the City the population has been most rapidly increasing.

The number of new houses certified as fit for habitation in each sanitary district is shown for 15 years in the Annual Report of the Medical Officer of Health for 1905 (page 224).

The greatest increase has been in Rusholme, Cheetham, Harpurhey, Moston, Newton, Openshaw, Ardwick, and Clayton. These districts vary very much as regards the changes in their death-rates.

In the majority the death-rate has decidedly improved in the last quinquennium. This is not true of Rusholme and Clayton. In the former it is not, perhaps, to be expected. Nevertheless, it would be advisable to give attention to the character of the new houses in both districts.

The greatest amount of improvement in the death-rate has occurred in districts in which building has not proceeded most rapidly, such as Ancoats, St. George's, and West Gorton. It is true that here there is most room for improvement, but it is satisfactory to find that it is taking place.

We might interrogate the infantile mortality to see whether the great improvement which has taken place in the last quinquennium has extended to this age.

We find that the average infantile mortality was for—

	In 1896–1900		1901–1905
The whole City.....	188·2	....	174·0
Ancoats	218·8	....	202·0

The improvement is but slight. Such as it is, it is almost entirely, if not entirely, seasonal, as is seen from the following figures :—

	1896-1900		1901-1905
The average infantile mortality for the City from Diarrhœa was	41·9	....	29·5

It is of interest also to see at what ages the death-rate is decreasing most rapidly. The figures are as follows :—

Average Death-rates—City of Manchester.

	0–4	5–14	15–24	25–44	45–64	65+
1891–1895	81·6	4·6	5·1	12·3	35·2	117·4
1896–1900	81·9	4·0	4·6	11·3	34·8	112·6
1901–1905	69·3	3·9	4·1	9·6	31·7	103·4

At ages up to 5 the last quinquennium shows marked improvement. At school age there was decided improvement in the previous quinquennium—not in the last. At ages 15–24 there was improvement in both quinquennia, about equal in amount. At ages 25–44 there has been very great improvement in the last quinquennium, but improvement was also shown in the previous quinquennium. At higher ages improvement is most marked in the last quinquennium.

On the whole, these figures are highly satisfactory, and indicate that influences are in operation highly favourable to adult life.

It is not possible to deduce from them anything specially bearing on housing. It is, however, probable that the greater part of the improvement manifested is due to other causes than housing.

Comparison of Male and Female Death-rates.

The following table shows the average death-rates in groups of ages for males and females respectively in three successive quinquennia. If the great improvement manifest in adult life were due chiefly to the lesser amount of alcohol consumed, we should expect, perhaps, that the improvement in the male mortality would exceed that in the female. Such is not the case.

We must, therefore, direct our attention also to other causes, such as higher wages accorded to labour, the influence of cycling, the extension of the wave of improvement previously shown at lower ages. Be the cause what it may, the effect is economically of the highest moment.

MANCHESTER.—AVERAGE MALE AND FEMALE DEATH-RATES IN THREE QUINQUENNIAL PERIODS IN AGE GROUPS.

Males.

YEARS	ALL AGES	0–	5–	10–	15–	20–	25–	35–	45–	55–	65–	75–	85+
1891–5	24·59	84·68	5·45	3·10	4·82	6·01	9·26	18·26	30·09	54·68	109·89	233·13	321·49
1896–1900	24·33	82·10	4·68	2·63	4·46	6·03	8·65	18·20	32·06	58·67	109·05	236·85	350·57
1901–5	21·55	74·16	4·96	2·62	3·86	5·03	7·52	14·90	27·04	51·75	95·70	175·93	343·96

Females.

YEARS	ALL AGES	0–	5–	10–	15–	20–	25–	35–	45–	55–	65–	75–	85+
1891–5	21·39	72·65	5·88	2·79	4·01	5·34	8·55	14·31	29·46	45·10	85·47	184·72	278·63
1896–1900	20·96	52·19	4·96	2·49	3·57	4·53	7·42	14·13	22·12	44·73	88·39	205·80	274·66
1901–5	18·47	63·35	5·15	2·77	3·32	4·30	5·97	11·76	20·07	39·84	77·66	140·70	273·22

Overcrowding.

It is matter of general agreement that overcrowding is one of the causes of increased sickness, and of increased mortality.

Two forms of overcrowding have been distinguished—overcrowding on site, and overcrowding in rooms.

Considerable diversity of opinion has existed as to the effects of overcrowding on site ; that is to say, of density of population. The measure ordinarily used of density of population is the average number of persons per acre. The death-rates of different towns, however, do not correspond to the density of the population on area, and, in fact, the discrepancies are so wide as to make it evident that density on area is liable to be entirely overweighed by other factors in the causation of death-rate. To a less extent, the same thing is manifest on a comparison of the density on area of population in different sanitary districts.

It is not difficult to see why there is no close correspondence between density of inhabitants per acre and the death-rate.

Why should there be ? It seems clear that the more persons there are per acre, given precisely the same conditions throughout, the more opportunities will arise for the propagation of infectious disease. Moreover, while up to a certain point of density under any particular system of housing, say at the rate of 150 persons per acre for four-roomed houses, the area being occupied exclusively by dwelling-houses, there need arise no increase of bad health until the limit is reached, if density exceeds this point the houses approximate too closely, there is insufficiency of light, and there is imperfect movement of air.

In the above figure no allowance is made for other buildings or open spaces, and the space is supposed entirely covered. In actual practice, of course, the number of persons who could be housed in four-roomed houses in a healthy manner would not exceed 100 per acre.

We should therefore expect, and in fact we find, that running through the irregularities of relationship there is a certain tendency to correspondence between density on area and high death-rate.

There is a further reason why this tendency should be shown. Density per acre is, in part, dependent on the average number of persons per room, and this ratio has a very direct relationship to sickness and death-rate.

The last-named relation is intimate for two reasons, one of which has the effect of exaggerating the sanitary effect of crowding in rooms. It is intimate because the greater the number of persons per room the more are infectious diseases spread, and the greater is the injury to health caused by breathing impure air. It is also intimate because a higher proportion of persons per room implies a greater degree of poverty, at all events below a certain point not easy to define, and the effects of privation and anxiety on health are thus added to those dependent on other causes.

It may therefore be matter for surprise that the correspondence between density on area and death-rate fails so frequently

The following are, no doubt, the principal reasons :—

1. The apparent density is not the real density.

If, in one town, there is a large unoccupied area, and the surface of another is almost entirely built over, given the same mode of building the former will show an apparent much lower density per area.

But the density of houses on areas entirely occupied by buildings may be practically the same, and yet the figure for one district may be much lower than that for another. Thus the figure expressing the density per acre in Ancoats is much lower than the figure expressing the density in Hulme, yet the effective density in Ancoats is not less than in Hulme, and the death-rate is higher.

There are more mills and places of business in Ancoats, which take up space and obscure the effective density of habitation. As these deprive the houses of light, they render the effective density, in fact, greater.

Differences are also introduced by the methods of building. If in one area the streets, as well front as back, all open freely into cross streets, and if there are no closed courts, while another area is so built upon as to enclose the air in close spaces, there may be no great difference in persons per acre, and yet the effective density may be much greater in the latter area

One might even have spacious streets and a very high effective density, from the imperfect internal arrangements of the houses, or from want of space in their rear.

On the other hand, there may be considerable density on area, as in the tenement dwellings in Kensington, and yet the conditions of life may be wholesome, suitable provision of space being made in the front and rear of the dwellings, the closets and the approaches to separate tenements being also suitably arranged.

In the third place, the influence of a bad building plan on the unwholesomeness of habitation may be reinforced or counteracted in a very high degree.

It is manifest that if cottage houses are, as in many parts of Manchester, built with their backs close together, the effect of keeping the rear of the houses free from impurity in air and soil must be very great.

It is impossible to sweep away and rebuild vast tracts of an old town. Yet the existing conditions are such as to foster a great variety of infectious disease. It is, however, not necessary to proceed to such drastic measures.

It is necessary, and probably sufficient, to open out existing enclosed spaces ; to entirely alter, as rapidly as possible, consistently with careful work, the older methods of storing and removing excreta and refuse ; to provide good drainage

and a good, impermeable surface; to provide more light by limewashing in the rear of dwellings; to enforce necessary repairs of structure; and to put down as far as possible overcrowding in rooms.

The methods now adopted by the Sanitary Committee of opening out the passages between long rows of houses, and, where needful, making cross sections, is, in my opinion, a sound one, given the fulfilment of the other conditions mentioned.

There are, however, circumstances in which further structural alterations are needed to give a sufficiency of light, though in most cases it will be a question of the number of cross sections needed.

In some cases no alterations will suffice to render the habitations healthy.

It will be clear that, while, under any system of house construction on an area, there is a limit to the number of houses of a given type which may be placed on it without injury to health, the chief influence of housing on health depends upon the arrangement of the dwelling as regards access of light, movement of air, and avoidance of overcrowding in rooms. The last-named factor again is determined partly by the rate of wages, partly by the style of living, partly by the mode of occupation of the rooms available, and partly by the rent. The first-named determining factor is but little under the control of the Corporation, the next two much more so, while the last depends on the prosperity of the community and on the houses available. The provision of new houses for a growing population is subject to great changes, and may be accelerated or retarded by such causes as co-operation between sanitary authorities in regard to their building bye-laws.

In the Annual Report for 1903 are given figures, here reproduced, showing the relative amount of overcrowding in rooms in London, Manchester, Liverpool, and Glasgow respectively, which appear to show that the degree of crowding in rooms is much less in Manchester than in the other towns. They show, in effect, that there is much less crowding in rooms if we take the Registrar-General's standard of crowding, viz., over two persons per room.

Further, they show that the percentage of overcrowding in rooms was much less in Manchester at the Census of 1901 than at the Census of 1891 in all classes of dwellings, in spite of the circumstance that there were comparatively few unoccupied dwellings in 1901.

It appears, therefore, to be the fact that in Manchester the tendency has been for the working classes to aim at more house accommodation.

It is, thus, probable that the insanitary conditions of housing in Manchester are more external than internal.

A.—THE FOLLOWING ARE THE FACTS AS SUPPLIED BY THE CENSUS PUBLICATIONS:—

DISTRICT.	Rooms in Tenement	Tenements of less than Five Rooms	PERSONS PER TENEMENT IN THE TOP LINE; NUMBER OF TENEMENTS HAVING THAT NUMBER UNDERNEATH											
			1	2	3	4	5	6	7	8	9	10	11	12 or more
London	1	149,524	60,421	48,341	23,680	11,279	4,001	1,257	384	103	39	10	3	6
Liverpool	1	8,527	2,587	3,181	1,675	782	226	57	15	2	1	—	—	1
Glasgow	1	42,623	8,603	12,029	8,683	6,319	3,907	1,850	806	292	91	28	12	3
Manchester, 1901	1	2,140	820	870	318	87	28	10	2	1	3	—	—	1
„ **1891**	1	1,604	497	620	252	109	65	23	16	12	7	2	1	—
London	2	201,431	16,148	52,369	46,782	35,828	23,885	14,508	7,283	3,055	1,118	328	101	26
Liverpool	2	11,935	1,196	2,903	2,730	2,294	1,570	737	326	131	39	5	2	2
Glasgow	2	71,207	1,803	8,795	11,431	12,015	1,221	9,543	7,288	4,723	2,589	1,172	424	203
Manchester, 1901	2	6,869	871	1,884	1,591	1,197	771	331	148	56	9	9	2	—
„ **1891**	2	10,057	941	2,581	2,190	1,839	1,215	750	351	134	45	10	—	1
London	3	181,542	6,288	35,070	39,252	32,954	25,392	18,607	12,026	6,820	3,269	1,251	410	203
Liverpool	3	13,010	334	1,605	2,199	2,369	2,397	1,870	1,188	629	286	89	28	16
Glasgow	3	27,017	450	2,761	3,779	4,094	4,042	3,663	2,996	2,186	1,464	846	442	294
Manchester, 1901	3	4,994	192	871	997	933	774	576	359	174	82	22	7	7
„ **1891**	3	5,356	208	901	990	934	791	664	432	264	111	41	17	3
London	4	139,533	2,252	15,360	22,905	24,839	22,824	18,424	13,871	9,330	5,371	2,733	1,110	514
Liverpool	4	27,433	491	3,917	5,136	5,065	4,337	3,495	2,376	1,440	715	295	115	51
Glasgow	4	9,971	184	1,158	1,460	1,591	1,536	1,276	1,011	691	501	281	148	134
Manchester, 1901	4	47,569	938	6,787	8,939	9,083	7,542	5,885	3,877	2,429	1,231	574	185	99
„ **1891**	4	40,446	713	5,603	7,090	7,274	6,525	5,299	3,659	2,371	1,130	525	175	82

B.

DISTRICT	Total Tenements	Tenements of Less Than Five Rooms	PERSONS PER TENEMENT											
			1	2	3	4	5	6	7	8	9	10	11	12 and upwards
London	1,019,546	672,030	85,109	151,140	132,619	104,900	76,102	52,796	33,364	19,308	9,797	4,322	1,624	749
Liverpool	138,845	60,905	4,608	11,606	11,740	10,510	8,530	6,159	3,905	2,202	1,041	389	145	70
Glasgow	163,258	150,818	11,040	24,743	25,353	24,019	20,706	16,332	12,101	7,892	4,645	2,327	1,026	634
Manchester, 1901	112,854	61,572	2,821	10,412	11,845	11,300	9,115	6,802	4,386	2,660	1,325	605	194	107
,, **1891**	103,720	57,463	2,359	9,705	10,522	10,156	8,596	6,736	4,458	2,781	1,293	578	193	86

C.—PERCENTAGE OF TOTAL TENEMENTS HAVING 1, 2, 3, 4, 5 AND UPWARDS, ROOMS AT THE CENSUS OF 1901 IN LONDON, LIVERPOOL, GLASGOW, AND MANCHESTER, AND IN MANCHESTER AT THE CENSUS 1891.

	1	2	3	4	5 and upwards
Manchester, 1891	1·55	9·70	5·16	39·00	44·60
,, **1901**	1·90	6·09	4·43	42·15	45·44
Liverpool	6·14	8·60	9·37	19·76	56·14
London	14·67	19·76	17·81	13·69	34·08
Glasgow	26·11	43·62	16·55	6·11	7·62

D.—PERCENTAGE OF TENEMENTS OVERCROWDED, FOUR ROOMS AND UNDER, AT THE CENSUS 1901.

ROOMS	1	2	3	4	All Tenements up to Four Rooms inclusive
London	27·26	24·97	13·21	7·16	18·57
Liverpool	32·35	25·24	17·19	4·29	15·08
Glasgow	51·60	52·19	30·46	10·67	45·38
Manchester, 1901	21·03	19·30	13·04	4·39	6·68
,, **1891**	30·36	24·02	16·21	4·73	10·05

But if the average working man in Manchester is better housed, internally, than in London, Glasgow, or Liverpool, he must be either more sober and thrifty or he must be better off. It is probable that his superior housing does not arise from the former cause. Possibly the latter suggestion may be correct.

It is well, however, to consider the possibility that he may not be better off. In that case there will be some fallacy lurking under these figures.

Is it possible that with the diminution of smaller dwellings there is an increased tendency towards the occupation of larger houses, say of four rooms, by more than one family. The Census figures show that in regard to four-roomed houses also there was a diminished proportion of persons per room. Yet the diminution is less than in the case of houses of one, two, or three rooms. Nevertheless, even in four-roomed houses the percentage of overcrowding per room is much smaller than in London and Glasgow.

At the same time, it is necessary to remember that the increase of persons per room in a house of four rooms or upwards is, in respect of effective density per room, often a more serious matter than it is in a smaller dwelling. In the house of four rooms and upwards, the family often eke out the insufficiency of their own means by taking in lodgers. In these houses it is not usual to occupy more than two rooms as bedrooms, and the presence of lodgers usually means that the whole of the family sleep in one room.

Moreover, they usually live in one room, and the average family is considerably larger than that occupying a two-roomed house.

There is, thus, effectively much more crowding in houses of four rooms and upwards than appears from the mere numbers, so that the superiority of Manchester in point of overcrowding is not so great as it appears to be.

Yet there is no doubt that this district stands comparatively well in point of overcrowding, and we must therefore direct our attention largely to other questions connected with housing if we are to find in this any explanation of the comparatively high death-rate.

The effective crowding which exists in a large section of the four-roomed houses is only in part a necessary one, and might be considerably reduced if the total accommodation in the house were utilised. There appears to be no sufficient reason why the Sanitary Authority should not do something more to bring this about.

The Housing Policy of the Sanitary Committee and of the Manchester Corporation.

At no time have the Sanitary Committee committed themselves to any sole line of action in their efforts to amend the conditions of housing. Yet, in fact, they have pursued a particular line of action.

They have adopted the policy of clearing large areas and providing new houses, built on modern principles, only to a limited extent, and when it did not seem possible to mend the existing conditions.

The magnitude of the area covered by houses faultily planned has stood in the way of such a course, which is a very expensive one to the community when carried out under the Housing of the Working Classes Acts.

The Housing Committee appointed in 1885, under the able guidance of Alderman Walton Smith, addressed themselves first to the large number of back-to-back houses then existing, and to the cellar dwellings remaining.

A scheme was devised by the City Architect and Medical Officer of Health of that time, by which back-to-back dwellings might be altered so as to permit of the free movement of air through them, and of the provision of good yards and water-closets.

In accordance with this scheme, the greater number of these dwellings has been closed, and they have either been pulled down or altered, by removal of houses or otherwise, so as to render the conditions of habitation decent and tolerably healthy.

We may estimate the number of persons affected by these alterations at about 20,000.

t may be called the piecemeal operations of this Committee up to date are nted in the following tables:—

RN SHOWING THE NUMBER OF HOUSES CLOSED, DEMOLISHED, OR ADDED O OTHER HOUSES, THEREBY BEING DISCONTINUED AS SEPARATE HABITATIONS, VITHIN THE CITY, FROM FEBRUARY, 1885, TO DECEMBER 31ST, 1905, ALSO OR 1906.

ANITARY DISTRICT		Number of Houses Closed, Demolished, or Added together or to other Houses		Number of Houses Closed which have not up to the present time been allowed to be re-opened		Number of Houses Closed which have been subsequently demolished		Number of Houses Closed, and subsequently added together or to other Houses, thereby being discontinued as separate habitations	
		February, 1885, to Dec. 31st, 1905	1906	February, 1885, to Dec. 31st, 1905	1906	February, 1885, to Dec. 31st, 1905	1906	February, 1885, to Dec. 31st, 1905	1906
	1	376	...	100	...	157	...	119	...
	2	735	1	140	1	454	...	141	...
	3	771	...	170	...	283	...	318	...
	4	28	...	11	...	14	...	3	...
	5	23	...	6	...	9	...	8	...
	6	664	...	139	...	306	..	219	...
	7	287	...	97	...	146	...	44	...
	8	46	...	12	...	7	...	27	...
	9	762	...	65	...	427	...	270	...
Ancoats	10	559	...	26	...	330	...	203	...
ck	10	...	...	...	...	...	...	...	...
	11	455	...	15	...	244	...	196	...
	12	305	4	52	4	114	...	139	...
C-on-M.	13	30	...	6	...	8	...	16	...
Ardwick	13	...	...	...	...	...	...	...	...
	14	392	3	61	2	230	1	101	...
	15	340	...	37	...	192	...	111	...
	16	19	...	1	...	11	...	7	...
	17	248	6	28	3	147	3	73	...
	18	637	...	105	...	350	...	182	...
	19	28	...	...	...	9	...	19	...
ley	20	6	...	6	...	...	...	...	...
arhey ...	20	15	...	...	..	13	...	2	...
	21	...	...	...	...	...	...	...	...
	22	184	...	16	...	80	...	88	...
	23	39	...	13	...	12	...	14	...
	24	67	...	24	...	26	...	17	...
	25	...	...	...	...	...	...	...	...
	26	35	...	17	...	7	...	11	...
	27	16	...	2	...	8	. .	6	...
	28	74	...	3	...	31	...	40	...
	29	...	...	...	...	...	...	...	...
Totals		7141	14	1152	10	3615	4	2374	...

In the following table is seen the rate at which Insanitary Dwellings have been closed since 1885. This was greatest in the years 1894 and 1895. If it has since slackened, this is owing not to any lack of insanitary dwellings, but to fear of producing overcrowding, and to difficulties which have arisen :—

RETURN SHOWING THE NUMBER OF HOUSES CLOSED, DEMOLISHED, OR ADDED TO OTHER HOUSES, THEREBY BEING DISCONTINUED AS SEPARATE HABITATIONS, WITHIN THE CITY IN EACH YEAR FROM FEBRUARY, 1885, TO DECEMBER 31ST, 1906 (JANUARY TO DECEMBER IN EACH YEAR).

	1885 (From February)	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	Totals
Number of Houses Closed, Demolished, or Added to other Houses.....	56	103	117	191	282	165	287	564	509	782	707	507	284	296	641	266	58	346	303	392	285	14	7155
Number of Houses Closed which have not up to the present time been allowed to be re-opened	...	4	11	15	39	16	38	56	108	57	61	48	31	43	167	82	11	75	63	108	119	10	1162
Number of Houses Closed which have been subsequently demolished.....	46	69	55	113	170	70	120	279	195	511	415	297	185	154	284	104	37	119	130	161	101	4	3619
Number of Houses Closed and subsequently added together or to other Houses, thereby being discontinued as separate habitations.....	10	30	51	63	73	79	129	229	206	214	231	162	68	99	190	80	10	152	110	123	65	...	2374

The operations of the Committee under the Housing of the Working Classes Acts are set forth in their Special Report, issued in 1904, and need not be here recapitulated. They comprise the demolition of the areas Oldham Road (blocks 1 and 2), Pollard Street, Potts Street, Harrison Street, Lord Street, Love Lane, Pryme Street, and Chester Street, with a total estimated displacement of some 3,000 persons. The tenements and cottages on five of these areas and Walton House, taken together, accommodate 2,780 persons.

On February 15th, 1901, the purchase of the Blackley Estate was completed. This estate comprises 187 acres suitable for building purposes (acquired under the Housing of the Working Classes Act, 1890) and 50 acres suitable for allotments (acquired under the Allotments Act, 1887).

The object with which this Estate was acquired was to make provision compensatory for the houses closed by the action of the Sanitary Committee under the Local Act of 1867, though the City Council has further laid upon the Sanitary Committee the duty of making on this land provision in respect of houses demolished by street improvements. So far, 203 houses have been erected on this Estate, which promises in the future to be a valuable asset to the community.

More recently, a block of tenements has been erected in Rochdale Road. But this scheme stands in an entirely different position to the previous ones. It is not a reconstruction of an insanitary area, but a provision made to enable the Committee to proceed with alterations elsewhere.

The number housed by this scheme is 224.

It will be seen that the main policy has been to alter existing habitations, obstructive portions being removed so as to render the remaining existing houses healthy, and yards and water-closets being provided.

Taking into account the facts that drainage, closets, conditions of refuse removal, and construction of surface will be carefully looked to, I am of opinion that a great public improvement can be effected on these lines, and that it may be possible to provide in great measure against the want of damp-proof courses.

During the present year (1907), under the guidance of their energetic Chairman (Alderman Fildes), the Housing Committee have shown great activity in dealing with insanitary dwellings, and in tackling the question of storage and removal of excreta and refuse. Great progress is being achieved.

It may be well to recall that these alterations will justify themselves to owners of property in proportion as they are thorough, enduring, and calculated to give a lasting added value to the properties altered, through good workmanship and by the effectual removal of the insanitary conditions inherent in the houses.

The following tables show the numbers of new houses certified as fit for human habitation in each of the sanitary districts of the City (Table A), and in each of a number of neighbouring districts (Table B). It will be seen that there has been an increase of 300 in the number of new houses certified within the City during the year ending 31st October, 1906.

This increase is accounted for in the districts of Rusholme and Withington. An increase of houses has also taken place in the districts of Moston and Newton,

A.—Statement as to the Number of Dwelling-houses Certified as Fit for Human Habitation in the various Divisions of the City between 1890 and 1906.

District	1st Nov., 1890, to 31st Oct., 1891	1891 to 1892	1892 to 1893	1893 to 1894	1894 to 1895	1895 to 1896	1896 to 1897	1897 to 1898	1898 to 1899	1899 to 1900	1900 to 1901	1901 to 1902	1902 to 1903	1903 to 1904	1904 to 1905	1905 to 1906	Totals
Ancoats	31	195	54	70	7	97	113	53	25	28	33	1	4 including 1 Lodging house	11	1	46†	769
Central	Note:— 193 Artisans Dwellings																
St. George's		...	...	...	...	...	...	...	...	...	...	5	1	9	*95	...	303
Cheetham	8	38	76	97	37	155	269	370	315	128	253	171	199	240	133	186	2775
Crumpsall	17	7	18	24	44	39	37	41	18	102	53	56	82	85	57	50	730
Blackley	29	11	13	5	19	41	31	56	67	58	33	42	57	53	124	95	734
Harpurhey	55	60	60	170	191	342	253	346	327	169	129	70	92	14	7	30	2315
Moston	22	12	74	89	148	193	225	263	248	282	179	78	109	156	222	327	2627
Newton	40	20	10	30	65	140	96	136	134	110	90	211	167	230	193	287	1959
Bradford	36	39	49	21	65	67	198	91	103	198	47	239	29	40	7	5	1284
Beswick	2	8	15	8	...	97	118	128	98	119	175	94	...	15	...	...	877
Clayton	6	61	6	9	39	111	152	161	229	234	164	104	107	113	103	113	1712
Ardwick	4	34	25	59	177	261	192	295	361	145	110	109	171	13	45	36	2037
Openshaw	177	169	65	15	60	69	71	152	119	182	80	190	145	155	91	84	1824
Gorton (West)	178	110	30	2	2	20	87	236	178	57	...	...	...	50	38	3	991
Rusholme and Kirk.	51	37	76	89	211	277	294	354	486	462	288	346	258 122	453	261 95 356	345 109 454	4614
C.-on-M.	26	97	97	88	18	36	46	57	1	32	48	27	12	15	5	2	607
Hulme	...	2	1	1	...	29	24	4	3	2	4	1	6	...	1	2	80
Moss Side	...	...	...	...	...	...	...	...	...	...	...	...	...	...	364	220	
Withington	...	...	...	...	...	...	...	...	...	...	...	...	...	...	362	560	
City Totals	682	1093	669	777	1083	1974	2206	2743	2712	2308	1686	1744	1561	1652	2204	2500	16238

* NOTE —Including 64 Dwelling-houses belonging to Sanitary Committee and 1 Lodging-house.
† „ „ 1 Lodging-house and 44 Tenements at Chief Fire Station.

The number of new houses certified in Salford is smaller than in recent previous years. Eccles and Stretford, however, continue to increase rapidly. Levenshulme shows a diminution in the number of new houses. Gorton on the other hand exhibits a very decided increase. The aggregate number of new houses in adjoining districts has not varied materially during the last three years, having been in 1903–4, 2,144; in 1904–05, 2,149; in 1905–06, 2,108.

B.—New Houses Certified in Outside Districts from 1891 to 1906.

Districts	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
ord.....	...	254	564	454	613	883	872	1268	885	674	818	733	603	599	619	519
es	141	164	109	100	118	113	165	219	202	215	215	185	244	226	323	346
tford	30	43	38	274	356	313	355	340	262	265	320	329	379	483	365	376
ston	73	45	42	34	80	102	135	88	43	18	21	24	35	106	90	50
hington Urban District Council :																
Withington, including Whalley Range	23	31	17	50	70	79	162	171	225	169	59	52	35	139	...	...
idsbury	31	42	33	26	79	55	45	66	139	66	37	34	43	68	...	...
urnage...	...	...	26	21	...	1	24	13	1	14	14	59	1	...	...	...
horlton-cum-Hardy	81	63	10	37	94	155	182	152	55	191	220	182	247	215	...	...
s Side.....	...	...	...	...	...	...	...	119	35	403	400	314	157	234	...	...
enshulme	...	...	...	...	...	...	...	224	290	420	180	236	278	318	328	184
ylsden	...	...	...	...	...	...	...	126	36	41	43	...	135	50	33	38
on	...	...	...	...	...	...	...	397	411	352	353	187	402	362	391	685
Totals.....	379	632	839	996	1410	1701	1940	3183	2584	2828	2680	2335	2559	2800	2149	2198

On Overcrowding in Rooms.

From the figures already quoted from the Annual Report of 1903, it appears (Table D) that the percentage of overcrowded tenements is higher among one-roomed than among two-roomed, much higher among two-roomed than among three-roomed, and falls to a comparatively low point for four-roomed tenements.

We have already seen, however, that the four-roomed tenement is liable to no inconsiderable addition to its degree of overcrowding, and, as we shall see, the three-roomed tenement is subject, comparatively, at all events, to deduction on this score.

These figures apply to the whole City, and they are not applicable to particular districts, such as Hulme and Ancoats, which require special treatment.

Now it is manifest that in so far as the numbers of tenements of 1, 2, 3, or 4 rooms correspond to families, the smaller the number of the rooms the greater is the injury to health. It is probable that the deficiency most severely experienced is the impossibility of isolation, and that consequently the effects of a higher degree of overcrowding will be felt most severely in regard to infectious diseases.

This is clearly shown in Dr. Chalmers' admirable report on the death-rate in one-apartment houses. The following table is taken from this paper. Dr. Chalmers puts down the respiratory mortality to the impurity of the atmosphere in one-apartment rooms, though it is probable that a large proportion of this respiratory mortality is, in reality, due to infection.

The gradation of the death-rate according to the number of rooms is, indeed, very striking.

It owns, as Dr. Chalmers recognises, other causes than those which are to be classed as sanitary. We may fairly believe that in proportion as the number of rooms occupied diminishes, the family is, on the average, less capable, less thrifty, less prudent, less enlightened, less cleanly.

It is, perhaps, a deficiency in his figures that they relate only to one year. On the other hand, this is counterpoised by their magnitude.

That the figures represent circumstances, whether social or sanitary, other than overcrowding in the technical sense, appears to be shown by their correspondence with the death-rate in two-roomed houses in Manchester.

It way be assumed that, socially, the latter correspond with those occupying one-roomed tenements in Glasgow. (See Table.)

We are, however, in a position to give the death-rates in the more insanitary central portions of this City in tenements of 1, 2, 3, and 4 rooms, and also in tenements having 5 rooms and upwards. These death-rates are for the three years 1900–02, having for their central point April 1st, 1901, and are supplied separately for Ancoats, the Central district, St. George's, and Hulme.

It will be seen that the gradation observed for Glasgow is broken in Manchester by the three-roomed tenements, which show a considerably lower death-rate than four-roomed tenements. There are, however, properly speaking, very few three-roomed tenements, except in the Central division of the City, and apart from the limited number provided by the Corporation elsewhere, as in Hulme. They are for the most part four-roomed houses, in which one room is occupied by a shop. As already explained, owing to the manner in which houses are occupied, this does not add to the effective density. In fact, it probably diminishes it, as people keeping a shop are less likely to take lodgers than others, and are more likely to have a small family.

This may be the explanation of the apparent anomaly.

On the other hand, the figures for four-roomed houses, other than those mentioned, give support to the suggestion that the occupants do suffer in their effective density in the manner suggested.

GLASGOW, 1901.—DEATHS AND DEATH-RATES FROM "ALL" AND "CERTAIN" CAUSES IN HOUSES OF SEVERAL SIZES.

1 Size of Houses	2 Census Population	3 All Causes		4 Zymotics		5 Phthisis		6 Respiratory Disease (including Croup)	
		Deaths	Death-rate per 1000	Deaths	Death-rate per 1000	Deaths	Death-rate per 1000	Deaths	Death-rate per 1000
1 Apartment	104,128	3,405	32·7	771	7·4	247	2·4	792	7·6
2 Apartments	348,731	7,418	21·3	1,576	4·5	620	1·8	1,600	4·6
3 Apartments	151,754	2,081	13·7	290	1·9	178	1·2	362	2·4
4 Apartments and upwards	136,511	1,533	11·2	139	1·0	99	0·7	272	2·0
Institutions and Harbour	20,588	1,072	—	88	—	152	—	235	—
Not traced	—	207	—	10	—	48	—	41	—
City (including Institutions and Deaths not traced)	761,712	15,716	20·6	2,874	3·8	1,344	1·8	3,302	4·3

It should certainly give rise to grave heart-searchings to find that, in these years, the inhabitants of four-roomed houses in the areas mentioned suffered so high a mortality. The causes which I believe to have been specially

operative have been already mentioned, and more particularly I would recall the manner in which such houses are occupied. This deserves careful attention, since it may be possible to produce an alteration for the better by steady enquiry and persistent advice and pressure.

MANCHESTER.—Death-rates in Tenements of 1, 2, 3, 4 Rooms, and 5 Rooms and upwards, for the 36 months of which the Census of 1901 is the middle, for the Districts of Ancoats, Central, St. George's, and Hulme.

	Rooms	1	2	3	4	5 and upwards	General
ANCOATES	Tenements	219	1652	475	4777	2128	...
	Census Population	416	5742	2019	23328	12535	44040
	No. of Persons per room	1·90	1·74	1·42	1·22	...	...
	Deaths—3 years	17	613	67	2192	820	3709
	Death-rate	13·62	35·59	11·06	31·32	21·81	28·07
Percentage of tenements overcrowded		18·7	24·9	12·0	6·1	...	...

	Rooms	1	2	3	4	5 and upwards	General
CENTRAL	Tenements	367	662	562	1992	2000	...
	Census Population	791	2157	2478	9880	14706	30012
	No. of persons per room	2·16	1·63	1·47	1·24	...	...
	Deaths—3 years	111	265	283	768	1037	2464
	Death-rate	46·77	40·95	38·07	25·91	23·51	27·37
Percentage of tenements overcrowded		24·8	21·1	16·4	7·1	...	...

	Rooms	1	2	3	4	5 and upwards	General
ST. GEORGE'S	Tenements	382	1084	328	6556	3809	...
	Census Population	837	3801	1440	30658	20623	57359
	No. of Persons per room	2·19	1·76	1·46	1·17	...	...
	Deaths—3 years	52	550	87	2995	1002	4686
	Death-rate	20·71	48·23	20·14	32·56	16·20	27·23
Percentage of tenements overcrowded		28·3	23·5	16·2	4·6	...	...

	Rooms	1	2	3	4	5 and upwards	General
HULME	Tenements	385	1117	997	4993	6803	...
	Census Population	739	3416	4107	23106	34567	65935
	No. of Persons per room	1·92	1·53	1·37	1·16	...	...
	Deaths—3 years	276	369	221	2158	1918	4942
	Death-rate	124·5	36·01	17·94	31·13	18·50	24·98
Percentage of tenements overcrowded		23·6	16·3	9·9	4·8	...	...

Ancoats, Central, St. George's, and Hulme	Rooms	1	2	3	4	5 and upwards	General
	Tenements	1353	4515	2362	18318	14740	...
	Census Population	2783	15116	10044	86972	82431	197346
	No. of Persons per room	2·06	1·68	1·42	1·19	...	...
	Deaths—3 years	456	1797	658	8113	4777	15801
	Death-rate	54·62	39·63	21·84	31·09	19·32	26·69
	Percentage of tenements overcrowded	24·5	21·9	12·7	5·3	...	...

It will be observed that the percentage of overcrowded tenements of one room is highest in St. George's, while the death-rate in this class of tenement is far lower in St. George's and Ancoats than in Hulme and Central. It is probable that the nature of the tenancies differs widely, those in Hulme and Central being occupancies by families, while in St. George's and Ancoats they are more occupancies by individuals.

The death-rate in two-roomed tenements is highest in St. George's and Central.

The difference between the figures for these districts and Ancoats on one side, and those for Hulme on the other, is probably, in the main, due to social factors.

The death-rate in three-roomed tenements is much higher in Central than in the other three districts. It is probable that this is to be explained by the greater extent to which these tenements are created in the Central district by the sub-division of houses sublet in tenements, being then occupied by poor families. The difference is, no doubt, due mainly to social conditions.

On the other hand, the Central district has the smallest death-rate in tenements of four rooms, a circumstance not easy to explain in view of the higher death-rate in this district both in larger and in smaller tenements. It may be suggested that the proportion of two-roomed and three-roomed to four-roomed tenements being relatively high in this district, the persons occupying four rooms are to some extent a selected class.

The figures, taken as a whole, point to the sanitary conditions of this district (including under the term sanitary conditions all factors bearing on health) being worse in the Central than in other districts.

As regards the other three districts, the death-rate in four-roomed tenements must be regarded as strikingly high. As we have already seen, there are reasons why the possession of four rooms does not yield the advantage in point of health which we might expect.

Having regard only to the death-rates in tenements of less than five rooms, Hulme appears to be a more unhealthy district than Ancoats and less unhealthy than St. George's.

This is probably a correct representation of the fact if only the more central parts of the three districts are taken into account.

In order to obtain a more minute survey of the conditions of health prevailing in the Central portion of the City, the four districts already mentioned have been sub-divided into smaller areas, and for each area certain facts have been obtained, viz. :—

1. The area of each sub-district. (For this I am indebted to Mr. de Courcy Meade, who has kindly had the areas measured.)

2. The population at the Census of 1901.

3. The number of persons per acre.

4. The mean death-rate for three years, the 1st of April, 1901, being taken as the central point

These facts are exhibited in the following tables and sketch maps. In deciding on the size of the areas, a preliminary inquiry was instituted over a limited district, with a view to see what degree of migration occurs from one area to another. It was thus evident that it would be necessary to group enumeration districts, if one wished to prevent the death-rates from becoming unstable and meaningless. Further, they have been so arranged as to fall into areas which form, as it were, natural clumps within which migration would be more likely to occur than transmigration across them. Social considerations have, for the same reason, been considered.

When all possible care is taken, however, the death-rates obtained are influenced by transmigration.

5. Tables have been constructed showing for each sub-district the death-rate for the three years in groups of ages.

It will be found, on examining these tables, that a total high death-rate in a sub-district is accompanied by a high death-rate at each age group, and conversely that the death-rates in childhood and at ages 25–44 and 45–64 correspond, with special closeness, to the total death-rates. The death-rates in the sub-districts chosen have therefore considerable stability, and must be taken as fairly representing the total of sanitary conditions of the sub-district. This, it will be observed, is a consideration of much importance, as, in this manner, we are enabled to know the districts which most urgently require attention.

6. The tables also show for each sub-district the number of tenements of 1, 2, 3, 4, 5 and upwards, rooms, and the average number of occupants per room.

We can thus see, at a glance, the degree of crowding in each sub-district in different classes of dwelling.

The extent of overcrowding is recorded only for the whole district.

As might be expected, the death-rate in each sub-district corresponds in a general manner with the proportion of dwellings of one and two rooms in the sub-district.

On examination of the maps, we find, as already stated for larger areas, that there is no intimate relationship between the number of persons per acre and the death-rate. [These maps are placed opposite page 244.]

It is possible, by a comparison of the maps with one constructed by Dr. Tatham, after the Census of 1891, to obtain some idea of the death-rates prevailing in 1891 and 1901 in the worst areas. The areas, unfortunately, could not be made to correspond exactly.

The preparation of these tables and maps has devolved on Mr. W. H. Roos, who has done the work with his customary skill.

ANCOATS.

Deaths and Death-rates in Groups of Enumeration Districts, 1900-1-2.

numer-ation istricts	Tenements of	Average No. of Persons per Room		All Ages	0-5	5-	15-	25-	45-	65+
1, 2, 3, & 4	88 1 room	1·45	Deaths 1900-1-2	474	200	11	12	68	134	49
	406 2 rooms	1·71								
	54 3 rooms	1·57	Average Annual Death-rate	34·08	118·20	4·37	4·40	15·40	62·91	115·84
	344 4 rooms	1·38								

Number of persons per house of over 4 rooms—6·18. Number of houses—156.

ANCOATS—*continued.*

Enumeration Districts	Tenements of	Average No. of Persons per Room		All Ages	0–5	5–	15–	25–	45–	65+
5, 6, & 7	14 1 room	2·71	Deaths 1900–1–2	535	130	20	17	54	84	30
	175 2 rooms	1·85								
	83 3 rooms	1·62	Average Annual Death-rate	30·51	88·08	8·27	7·60	18·16	51·85	117·65
	330 4 rooms	1·37								

Number of persons per house of over 4 rooms—4·89. *Number of houses—156.*

Enumeration Districts	Tenements of	Average No. of Persons per Room		All Ages	0–5	5–	15–	25–	45–	65+
8, 9, 10, 11, 12, 13, 14, 15	8 1 room	2·88	Deaths 1900–1–2	685	293	25	29	114	154	70
	286 2 rooms	1·63								
	83 3 rooms	1·43	Average Annual Death-rate	27·93	83·26	4·71	5·91	16·34	47·80	117·85
	1063 4 rooms	1·19								

Number of persons per house of over 4 rooms—5·61. *Number of houses—324.*

Enumeration Districts	Tenements of	Average No. of Persons per Room		All Ages	0–5	5–	15–	25–	45–	65+
16, 17, 18, & 19	37 1 room	2·76	Deaths 1900–1–2	304	105	9	9	60	87	34
	81 2 rooms	1·88								
	72 3 rooms	1·22	Average Annual Death-rate	36·20	111·11	5·14	5·56	23·95	63·04	174·36
	266 4 rooms	1·21								

Number of persons per house of over 4 rooms—6·52. *Number of houses - 128.*

Enumeration Districts	Tenements of	Average No. of Persons per Room		All Ages	0–5	5–	15–	25–	45–	65+
20, 21, 22, 23, 24	3 1 room	2·00	Deaths 1900–1–2	389	153	22	17	64	97	36
	152 2 rooms	1·84								
	46 3 rooms	1·26	Average Annual Death-rate	29·39	96·77	7·30	6·02	17·54	51·40	127·66
	427 4 rooms	1·24								

Number of persons per house of over 4 rooms—5·68. *Number of houses - 276.*

ANCOATS—*continued.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
25, 26, 31, 32	21 1 room	1·52	Deaths 1900-1-2	362	168	14	16	49	82	33
	249 2 rooms	1·80								
	44 3 rooms	1·40	Average Annual Death-rate	27·26	93·02	4·75	5·85	13·15	47·05	102·80
	538 4 rooms	1·29								

Number of persons per house of over 4 rooms—5·08. Number of houses—106.

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
27, 28, 29, 30	1 room	.....	Deaths 1900-1-2	378	168	15	12	60	79	44
	53 2 rooms	1·75								
	16 3 rooms	1·10	Average Annual Death-rate	23·12	80·46	4·11	3·42	12·89	38·33	115·49
	589 4 rooms	1·11								

Number of persons per house of over 4 rooms—5·53. Number of houses—468.

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
33, 34, 35, 36, 37	35 1 room	1·74	Deaths 1900-1-2	455	178	24	15	77	107	54
	187 2 rooms	1·72								
	53 3 rooms	1·21	Average Annual Death-rate	27·40	88·29	6·94	4·49	16·50	39·24	137·40
	636 4 rooms	1·19								

Number of persons per house of over 4 rooms—5·96. Number of houses—269.

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
38, 39, 40, 41	13 1 room	1·85	Deaths 1900-1-2	301	131	14	13	48	61	34
	63 2 rooms	1·37								
	24 3 rooms	1·46	Average Annual Death-rate	22·36	74·01	4·71	4 50	12·94	33·44	114·48
	584 4 rooms	1·18								

Number of persons per house of over 4 rooms—5·87. Number of houses—245.

CENTRAL DISTRICT.

DEATHS AND DEATH-RATES IN GROUPS OF ENUMERATION DISTRICTS, 1900-1-2.

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0-5	5-	15-	25-	45-	65+
1, 2	171 1 room	2·15	Deaths 1900-1-2	390	122	13	11	73	105	66
	73 2 rooms	1·81								
	81 3 rooms	1·53	Average Annual Death-rate	36·03	106·18	6·81	5·36	20·47	56·18	236·56
	183 4 rooms	1·24								

Number of persons per house of over 4 rooms—6·83. *Number of houses—248.*

Enumeration District	Tenements of	Average No. of persons per room		All Ages	0-5	5-	15-	25-	45-	65+
3	9 1 room	1·55	Deaths 1900-1-2	149	43	5	6	25	50	20
	34 2 rooms	1·68								
	36 3 rooms	1·49	Average Annual Death-rate	28·68	103·86	7·15	5·71	12·92	53·42	123·46
	30 4 rooms	1·42								

Number of persons per house of over 4 rooms—8·16. *Number of houses—156.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0-5	5-	15-	25-	45-	65+
4, 5	44 1 room	1·86	Deaths 1900-1-2	366	103	7	22	85	93	51
	82 2 rooms	1·55								
	60 3 rooms	1·54	Average Annual Death-rate	40·63	117·98	4·86	12·93	28·11	58·44	173·47
	150 4 rooms	1·26								

Number of persons per house of over 4 rooms—6·45. *Number of houses—253.*

CENTRAL DISTRICT—*continued.*

Enumeration District	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
6	1 room	.....	Deaths 1900-1-2	119	41	...	4	15	37	22
	25 2 rooms	1·24								
	25 3 rooms	1·52	Average Annual Death-rate	26·23	79·92	...	4·12	12·34	45·34	156·03
	81 4 rooms	1·19								

Number of persons per house of over 4 rooms—7·18. *Number of houses—131.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
7, 17, 20	1 1 room	1	Deaths 1900-1-2	87	27	6	5	12	25	12
	32 2 rooms	1·36								
	42 3 rooms	1·49	Average Annual Death-rate	18·80	115·38	11·49	3·78	6·81	28·84	95·24
	57 4 rooms	0·97								

Number of persons per house of over 4 rooms—6·51. *Number of houses—171.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
8, 6, 18, 19	54 1 room	2·39	Deaths 1900-1-2	432	98	10	10	109	132	73
	105 2 rooms	1·50								
	84 3 rooms	1·25	Average Annual Death-rate	27·51	85·07	4·32	2·58	20·41	50·63	177·62
	263 4 rooms	1·22								

Number of persons per house of over 4 rooms—8·05. *Number of houses—396.*

CENTRAL DISTRICT—*continued.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
9, 10, 11, 12, 13, 14, 15	42 1 room	2·12	Deaths 1901–1–2	699	273	22	24	108	191	81
	194 2 rooms	1·63								
	131 3 rooms	1·40	Average Annual Death-rate	27·85	92·39	4·15	4·58	15·02	49·93	137·75
	1047 4 rooms	1·21								

Number of persons per house of over 4 rooms—9·94. *Number of houses—332.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
21, 22, 23	46 1 room	1·85	Deaths 1900-1–2	203	96	5	13	27	35	27
	119 2 rooms	1·76								
	103 3 rooms	1·59	Average Annual Death-rate	16·09	56·04	1·68	4·39	8·36	23·62	105·88
	181 4 rooms	1·51								

Number of persons per house of over 4 rooms—6·74. *Number of houses—313.*

ST. GEORGE'S.

DEATHS AND DEATH-RATES IN GROUPS OF ENUMERATION DISTRICTS, 1900–1–2.

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65 +
1, 2	53 1 room	2·4	Deaths 1900-1–2	310	103	8	13	59	95	32
	181 2 rooms	1·8								
	30 3 rooms	1·6	Average Annual Death-rate	37·30	114·06	4·97	7·60	22·37	79·17	128·51
	170 4 rooms	1·4								

Number of persons per house of over 4 rooms 5·3. *Number of houses—170.*

ST. GEORGE'S—*continued.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65 +
3, 4, 5, 6, 7	41 1 room	2·3	Deaths 1900-1-2	413	141	14	10	68	116	64
	99 2 rooms	1·6								
	51 3 rooms	1·3	Average Annual Death-rate	26·32	85·45	4·74	2·92	14·01	49·07	145.12
	378 4 rooms	1·6								

Number of persons per house of over 4 rooms—5·6. *Number of houses—503.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65 +
8, 9, 10, 11, 12, 13, 14	14 1 room	1·79	Deaths 1900-1-2	606	262	25	29	100	114	76
	80 2 rooms	1·79								
	27 3 rooms	1·48	Average Annual Death-rate	24·53	89·39	4·45	5·45	14·25	35·32	129·25
	775 4 rooms	1·21								

Number of persons per house of over 4 rooms—5·25. *Number of houses—770.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65 +
15, 16, 17, 18, 19, 20, 21, 22, 23	9 1 room	1·00	Deaths 1900-1-2	786	363	35	35	95	175	83
	43 2 rooms	1·42								
	12 3 rooms	1·17	Average Annual Death-rate	24·25	80·51	4·97	5·18	10·11	42·74	134·96
	1747 4 rooms	1·12								

Number of persons per house of over 4 rooms – 5·00. *Number of houses – 562.*

ST. GEORGE'S—*continued.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65 +
24, 25, 26, 27, 28	8 1 room	1·50	Deaths 1900-1-2	508	240	25	12	62	102	67
	33 2 rooms	1·44								
	12 3 rooms	1·31	Average Annual Death-rate	25·27	78·51	5.31	3·06	11·18	42·45	144·09
	1116 4 rooms	1·21								

Number of persons per house of over 4 rooms—5·03. *Number of houses—231.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
29, 30	6 1 room	1·50	Deaths 1900-1-2	114	41	5	4	21	25	18
	3 2 rooms	0·67								
	5 3 rooms	1·20	Average Annual Death-rate	15·03	51·77	3·22	2·33	9·40	22·77	93·75
	208 4 rooms	1·04								

Number of persons per house of over 4 rooms—4·96. *Number of houses—329.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
31, 32	10 1 room	1·7	Deaths 1900-1-2	209	65	4	8	44	50	38
	60 2 rooms	1·9								
	32 3 rooms	1·5	Average Annual Death-rate	49·06	191·74	6·77	12·76	26·19	59·31	211·11
	36 4 rooms	1·6								

Number of persons per house of over 4 rooms—12·6. *Number of houses—63.*

ST. GEORGE'S—*continued.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
33, 34, 35	175 1 room	2·3	Deaths 1900-1-2	369	119	8	9	75	112	46
	232 2 rooms	1·8								
	51 3 rooms	1·65	Average Annual Death-rate	45·34	125·53	5·13	6·96	27·20	82·96	199·13
	125 4 rooms	1·3								

Number of persons per house of over 4 rooms—7·7. Number of houses - 75.

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
36, 37, 38, 39	34 1 room	1·9	Deaths 1900-1-2	396	165	13	13	67	100	38
	262 2 rooms	1·8								
	66 3 rooms	1·6	Average Annual Death-rate	36·42	116·28	4·93	6·79	21·09	64·47	218·39
	333 4 rooms	1·3								

Number of persons per house of over 4 rooms—5·8. Number of houses—96.

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
40, 41, 42, 43, 44	21 1 room	2·71	Deaths 1900-1-2	585	282	33	17	77	117	59
	70 2 rooms	1·73								
	20 3 rooms	1·42	Average Annual Death-rate	28.05	99·68	6·79	4·07	13·07	45·35	113·03
	989 4 rooms	1·19								

Number of persons per house of over 4 rooms—5·34. Number of houses—351.

ST. GEORGE'S—*continued.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0-5	5-	15-	25-	45-	65+
45, 46	1 room ...	.....	Deaths 1900-1-2	169	56	5	9	27	45	27
	2 rooms...	1·75								
	3 rooms...	1·10	Average Annual Death-rate	15·40	44·34	2·22	3·96	8·29	27·83	87·38
	4 rooms...	1·04								

Number of persons per house of over 4 rooms—5·14 Number of houses—453.

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0-5	5-	15-	25-	45-	65+
47, 48	11 1 room ...	1·64	Deaths 1900-1-2	154	74	6	6	17	28	23
	14 2 rooms...	1·57								
	15 3 rooms...	1·09	Average Annual Death-rate	18·86	84·19	3·28	3·68	7·46	21·66	89·15
	368 4 rooms...	1·05								

Number of persons per house of over 4 rooms—5·15. Number of houses—206.

HULME.

DEATHS AND DEATH-RATES IN GROUPS OF ENUMERATION DISTRICTS, 1900-1-2.

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0-5	5-	15-	25-	45-	65+
1, 2, 3, 4, 6	23 1 room	1·56	Deaths 1900-1-2	540	224	24	19	80	136	57
	234 2 rooms	1·63								
	170 3 rooms	1·52	Average Annual Death-rate	34·43	104·72	6·85	6·40	17·49	64·21	149·61
	498 4 rooms	1·23								

Number of persons per house of over 4 rooms—5·19. Number of houses—231.

HULME—*continued.*

umer-tion stricts	Tenements of	Average No. of persons per room		All Ages	0-5	5-	15-	25-	45-	65+
	6 1 room	1·67	Deaths 1900 1-2	209	96	10	6	36	40	21
7, 10	45 2 rooms	1·69								
	25 3 rooms	1·37	Average Annual Death-rate	30·16	100·63	6·54	4·64	17·52	43·01	125·00
	206 4 rooms	1·25								

Number of persons per house of over 4 rooms—5·19. *Number of houses—195.*

umer-tion stricts	Tenements of	Average No. of persons per room		All Ages	0-5	5-	15-	25-	45-	65+
	9 1 room	1·67	Deaths 1900-1-2	263	110	9	13	34	60	37
, 11, 2, 13	93 2 rooms	1·58								
	54 3 rooms	1·12	Average Annual Death-rate	23·49	80·94	4·03	5·82	10·07	36·30	118·59
	372 4 rooms	1·14								

Number of persons per house of over 4 rooms—5·10. *Number of houses—302.*

umer-tion stricts	Tenements of	Average No. of persons per room		All Ages	0-5	5-	15-	25-	45-	65+
	26 1 room	2·00	Deaths 1900-1-2	291	112	4	8	49	69	49
4, 15, 21, 22	26 2 rooms	1·62								
	27 3 rooms	1·53	Average Annual Death-rate	24·51	73·49	1·61	3·41	13·70	42·44	152·65
	410 4 rooms	1·14								

Number of persons per house of over 4 rooms—5·06. *Number of houses—361.*

HULME—*continued.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
16, 17	1 room	None	Deaths 1900–1–2	197	66	6	11	33	59	22
	9 2 rooms	1·61								
	24 3 rooms	1·43	Average Annual Death-rate	22·86	80·59	3·38	6·16	12·81	42·66	78·87
	56 4 rooms	1·23								

Number of persons per house of over 4 rooms—4·89. *Number of houses—504.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
18, 19, 20, 23	16 1 room	1·31	Deaths 1900–1–2	259	110	9	6	35	63	36
	56 2 rooms	1·17								
	16 3 rooms	1·35	Average Annual Death-rate	21·76	77·36	3·99	2·43	9·91	33·49	104·38
	284 4 rooms	1·02								

Number of persons per house of over 4 rooms—4·72. *Number of houses—548.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
24, 25, 26, 29	24 1 room	1·54	Deaths 1900–1–2	271	85	8	13	42	72	51
	54 2 rooms	0·94								
	32 3 rooms	1·17	Average Annual Death-rate	18·83	69·27	3·20	3·80	9·57	30·89	96·59
	42 4 rooms	0·99								

Number of persons per house of over 4 rooms—5·00. *Number of houses—875.*

HULME—*continued.*

numeration districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
30, 31, 32, 33, 34	24 1 room	1·38	Deaths 1900–1–2	377	139	19	15	60	80	64
	64 2 rooms	1·26								
	83 3 rooms	1·29	Average Annual Death-rate	21·85	63·64	5·23	4·65	11·00	35·09	135·88
	386 4 rooms	1·06								

Number of persons per house of over 4 rooms—4·93. *Number of houses—730.*

numeration districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
27, 28, 35, 36, 37, 38	13 1 room	1·77	Deaths 1900–1–2	398	121	12	10	65	125	65
	39 2 rooms	1·24								
	48 3 rooms	1·29	Average Annual Death-rate	20·86	59·93	3·06	2·59	11·15	44·28	103·17
	319 4 rooms	1·00								

Number of persons per house of over 4 rooms—5·08. *Number of houses—940.*

numeration districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
39, 40, 41, 42, 43, 44, 45	51 1 room	1·80	Deaths 1900–1–2	558	224	18	21	73	137	85
	105 2 rooms	1·56								
	59 3 rooms	1·28	Average Annual Death-rate	22·72	75·04	3·36	4·42	9·78	40·81	131·17
	655 4 rooms	1·18								

Number of persons per house of over 4 rooms—5·21. *Number of houses—852.*

HULME—*continued*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
46, 47, 48, 49	23 1 room	1·70	Deaths 1900-1-2	323	138	9	12	51	70	4
	55 2 rooms	1·27								
	92 3 rooms	1·23	Average Annual Death-rate	24·79	76·92	3·18	4·88	13·24	39·48	131·3
	492 4 rooms	1·07								

Number of persons per house of over 4 rooms—5·61. *Number of houses—303.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
8, 9, 50, 51, 56, 57, 58, 59, 60, 61	158 1 room	2·28	Deaths 1900-1-2	944	402	35	33	140	219	11
	312 2 rooms	1·69								
	264 3 rooms	1·44	Average Annual Death-rate	31·39	102·92	5·33	5·62	16·08	51·01	158·
	743 4 rooms	1·28								

Number of persons per house of over 4 rooms—5·93. *Number of houses—619.*

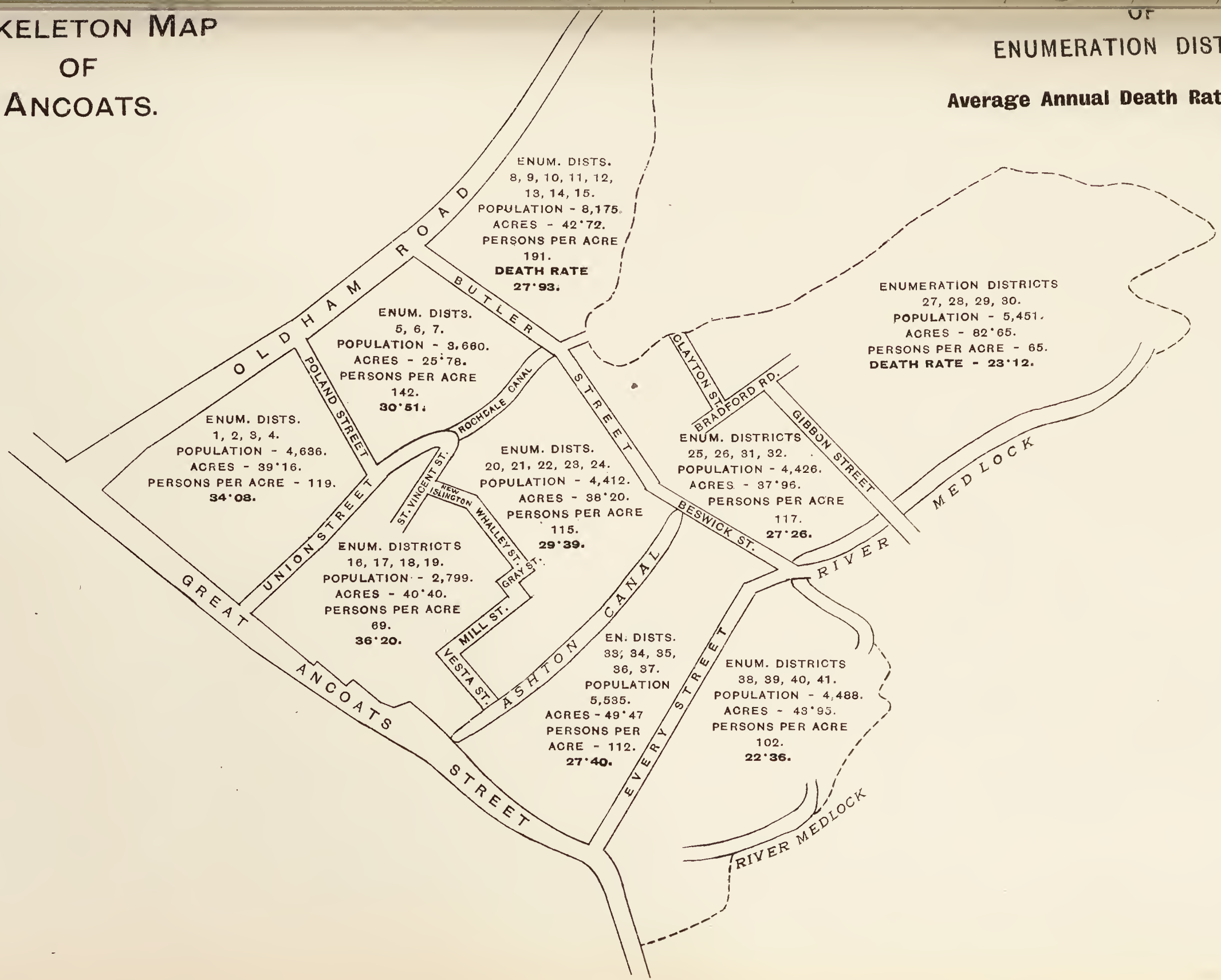
Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
52	1 room	None	Deaths 1900-1-2	92	43	8	6	13	16	
	8 2 rooms	1·94								
	5 3 rooms	1·33	Average Annual Death-rate	25·47	86·35	10·14	8·58	12·21	34·86	58·82
	116 4 rooms	1·22								

Number of persons per house of over 4 rooms—5·06. *Number of houses—116.*

Skeleton Map of Ancoats.

of Enumeration Districts.

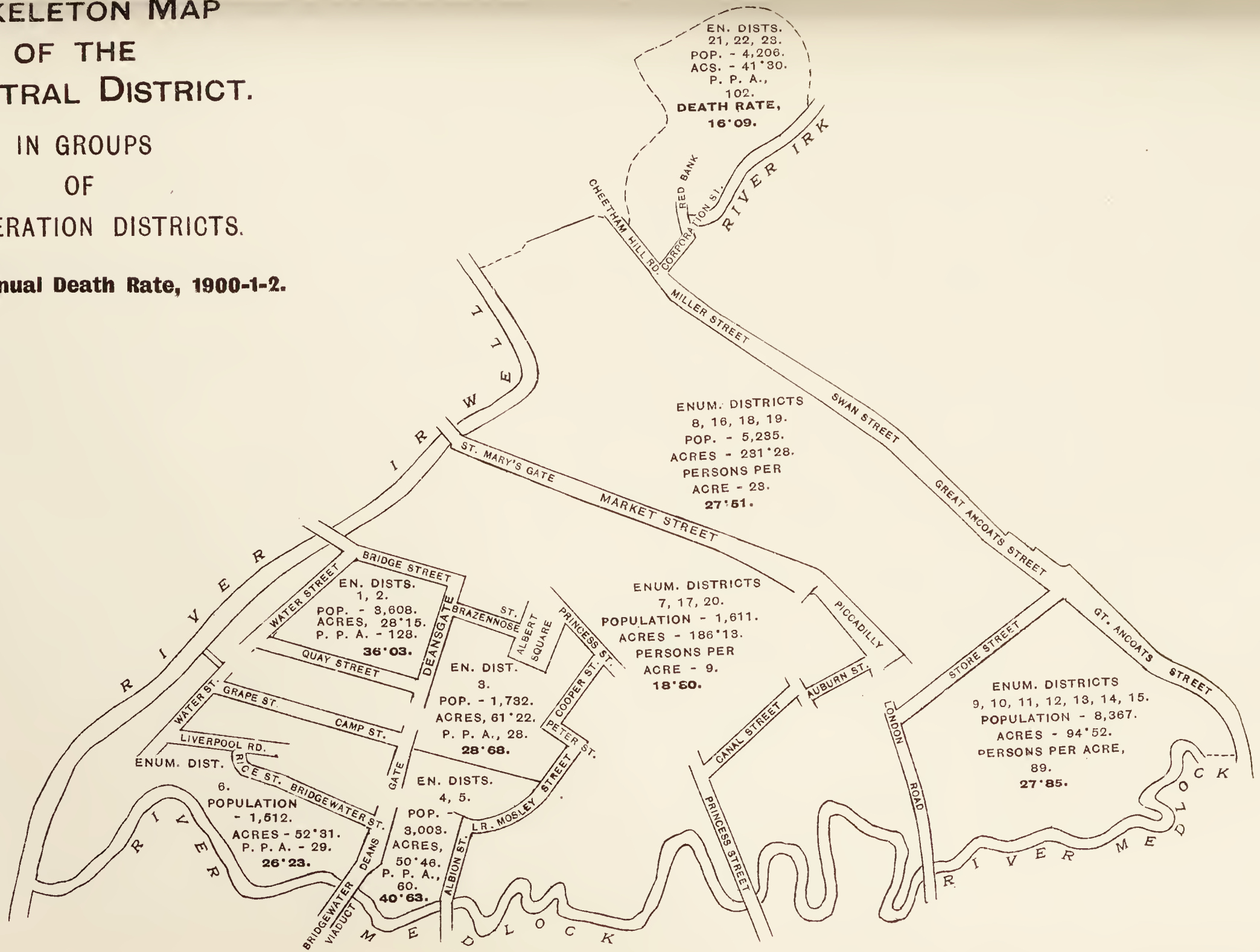
Average Annual Death Rate, 1900-1-2.



Skeleton Map of the Central District.

In Groups of Enumeration Districts.

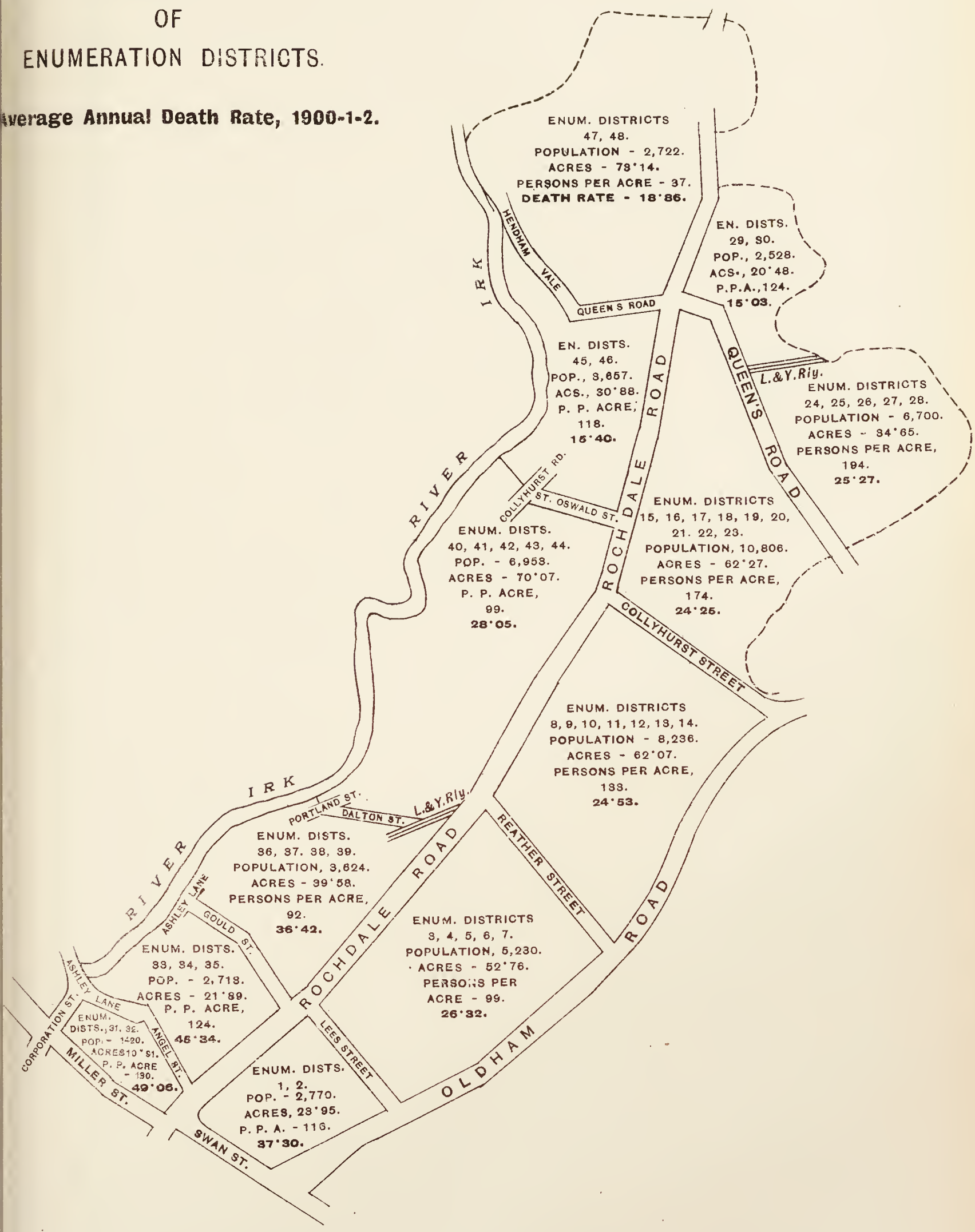
Average Annual Death Rate, 1900-1-2.



Skeleton Map
of
St. George's.

IN GROUPS
OF
ENUMERATION DISTRICTS.

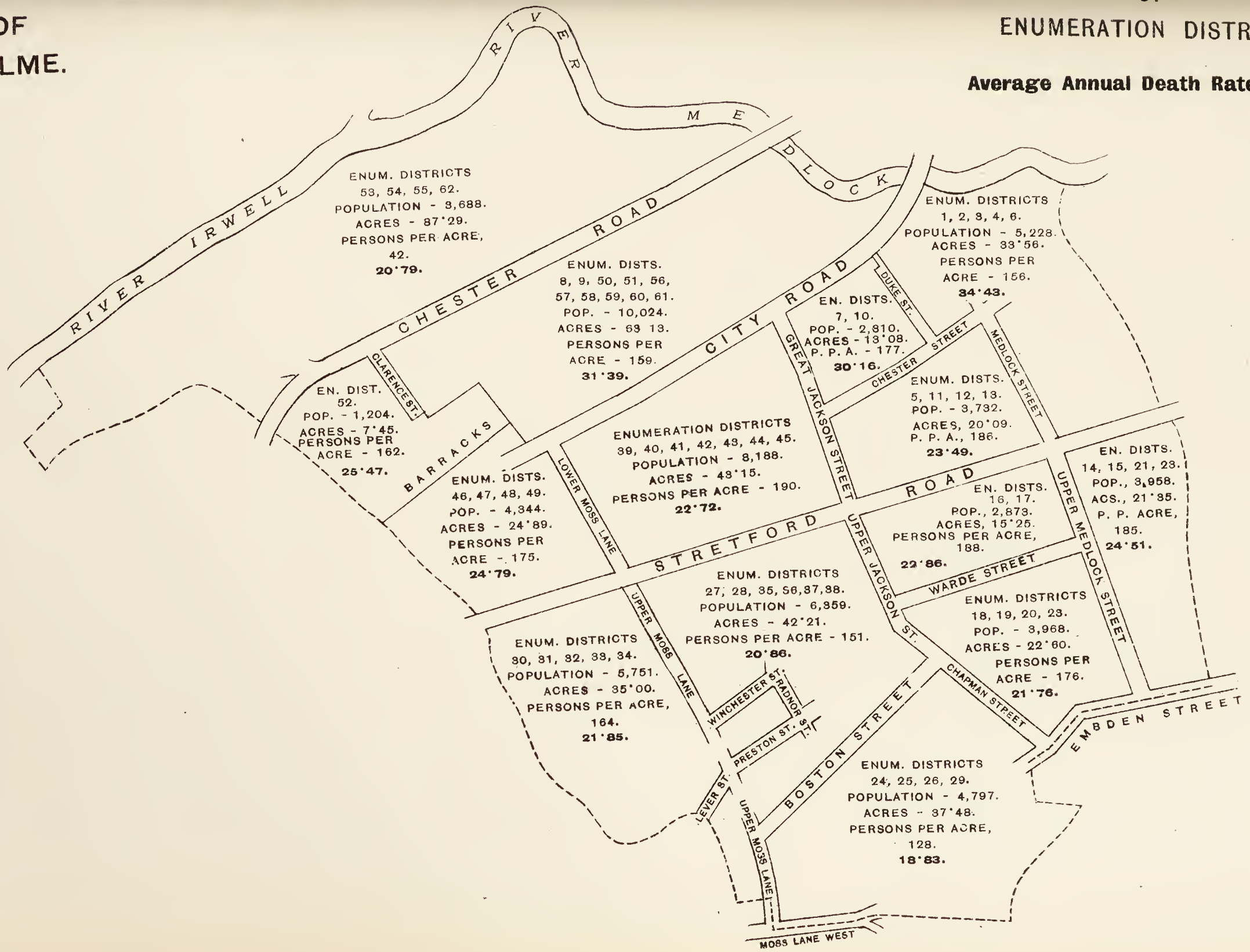
Average Annual Death Rate, 1900-1-2.



SKELETON MAP
OF
HULME.

OF
ENUMERATION DISTRICTS.

Average Annual Death Rate, 1900-1-2



HULME—*continued.*

Enumeration Districts	Tenements of	Average No. of persons per room		All Ages	0–5	5–	15–	25–	45–	65+
53, 54, 55, 62,	12 1 room	1·83	Deaths 1900–1–2	230	69	9	14	39	60	39
	17 2 rooms	1·77								
	98 3 rooms	1·33	Average Annual Death-rate	20·79	54·76	4·35	5·66	11·55	36·76	156·63
	414 4 rooms	1·77								

Number of persons per house of over 4 rooms—5·60. *Number of houses—227.*

These tables and maps show, for each sub-district of Hulme, Central, Ancoats, and St. George's; the annual death-rate for three years, having for their central point the first of April, 1901, at all ages, and at groups of ages; the number of tenants of 1, 2, 3, and 4 rooms respectively; and the average number of persons in each class of tenement. The degree of overcrowding is thus shown for each sub-district, as well as the manner in which the population is housed.

The stability shown by these death-rates renders it desirable that the other more insanitary portions of the City should be studied in a similar manner.

This will be done, in the first instance, for Chorlton-upon-Medlock.

How could we determine the extent to which the death-rates in tenements of 1, 2, 3, 4 or more rooms is dependent, on the one hand, on the varying amounts of house accommodation, and on the varying extents to which such accommodation is used, and, on the other, on the sanitary and social conditions by which different districts are affected?

To this question it would appear that some answer might be obtained by the study of figures for each sub-district, as a whole, similar to those which have been obtained for each of the four entire districts already considered.

The effect on overcrowding of the policy pursued by the Committee in dealing piecemeal with insanitary property, in opening out courts, etc.

It has been alleged against this plan of action that the removal of a portion of the houses dealt with, and the permanent closing of others, has the effect of increasing overcrowding in the neighbourhood of the houses condemned and either altered or closed.

In opposition to this view, Alderman Walton Smith put forward the opinion that the effect was but temporary, and that the balance soon adjusted itself by a steady pressure of the population towards the outskirts of the City, the

overflow being accompanied by a relaxation in the density of occupation of individual houses, which spreads steadily, in the manner of a wave, towards the districts affected. Care has been taken, however, to distribute the operations of the Committee over different parts of the City.

We have not the means of comparing the density of occupation of tenements and rooms in 1891 and 1901, so far as individual districts are concerned, but for the whole City we can make the comparison from the Census figures.

Table D (already quoted from the Annual Report for 1903) shows that during the inter-censal period 1891–1901 the percentage of tenements overcrowded diminished for each class of tenement—1, 2, 3, and 4 roomed. Now, 1 and 2 roomed tenements occur chiefly in the more centrally placed districts. We may fairly conclude, therefore, that the operations of the Sanitary Committee did not produce overcrowding in any class of dwelling to an appreciable extent.

As regards the individual districts already considered, we find that in 1901 the districts of Hulme and Ancoats, which were affected by the operations of the Sanitary Committee in 1891–1901 far more than the other two districts, do not show a higher density of occupation than the other districts in any class of tenements. In the case of Hulme, rather the reverse is the case.

We must not hastily assume that the disturbance of the occupants of houses has no such effect, but we may assume either that the action of the Sanitary Committee was small as compared with other disturbances of housing, or that sanitary alterations would have to be decidedly greater in extent, and more rapid, to produce a material degree of overcrowding.

The question is, no doubt, an important one; but unless corresponding figures for small areas could be obtained for 1891 from the Registrar-General, which is extremely doubtful, there are no means of absolutely settling it.

The issue is somewhat perturbed by the greater extent of other alterations in Ancoats and the Central districts which occurred in those years. None of the districts, however, were free from considerable disturbances.

It may safely be said that the changes produced in density by the more limited operations of the Sanitary Committee are not equal to those produced by other improvements, and that the figures do not indicate any famine of house room in any particular district or sub-district. The facts, taken together, support the contention of Alderman Walton Smith.

On the degree of precision involved in conclusions drawn from the death-rates of sub-districts.

We have already seen that the death-rates of the sub-districts chosen, when taken over three years, may be regarded as stable. It would certainly be unsafe to take enumeration areas as the unit. As we have seen, there is considerable transmigration from one small area to another, a result which is liable to be much modified by the interposition of a wide road or natural boundary, or by the transition to a different class of habitation. Supposing we take a square area, such that migration can just take place within it, sufficient to give it stability. If now we triple the size of the sides, we have a square which is nine times the size, but the exposed boundary is 12 times as great. It is not until we take a boundary six times as great that we get a square the area of which has increased greatly in excess of the exposed boundary.

Stability once secured, therefore, we have to increase the area very greatly to add to the value of the figures.

It may happen, however, that the figures are stable, and yet give us no indication of the forces at work in the district producing a high death-rate.

This observation is especially applicable to the sub districts with very high death-rates, in which exist large common lodging-houses, housing a migratory population. In all such houses there is a constant element, but this element is very varying in its proportions. As things stand, we cannot assume that our common lodging-houses are much less liable to the generation of disease than are similar houses elsewhere, and, if no more fatal sickness enters them than is generated in them, the death-rates of the sub-districts is a measure of the insanitary forces at work.

There is, however, reason to believe that this does not represent the fact, and that sick persons come from other districts into the Manchester common lodging-houses with a view to get into the Crumpsall Union Hospital. If this be correct, it is evident that the death-rate will be raised above the point which would represent the conditions prevalent in the district.

Stability, then, is consistent with considerable transmigration, provided that this is steady. Such steadiness of flux is, however, only applicable in common lodging-house districts.

Meanwhile, it would seem that the deaths allocated to these districts are out of a larger population than is present at any one time, and may be excessive.

It is not easy to summarise the above discussion of facts relating to housing, but a few of the points may be thus stated :—

1. The recent improvement in the Manchester death-rate has been considerably greater than that for England and Wales generally.

2. The death-rate is determined by a variety of factors, such as social well-being, habits of life, state of the atmosphere, constitution of the population, conditions of work, degree of enlightenment, etc. Amongst these, the circumstances of housing is one.

3. On a comparison of the death-rate with that of other large towns, taken along with a comparison of the housing conditions as revealed by the Census, it appears that the degree of housing accommodation cannot be the chief reason of the high death-rate.

4. There are, however, other conditions of housing, such as damp, bad closet arrangements, and deficiency of space in the rear of dwellings, in respect of which Manchester is badly off, and which call urgently for amendment.

5. Social factors have been largely operative in producing the improvement in the death-rate in 1901–05. Doubtless, however, the work of the Sanitary Committee has materially contributed.

6. There is no close correspondence between density on area and death-rate.

7. There is an intimate relation between the death-rate and the number of persons per room.

It is probable that this relation is largely social in its character, though the more persons per room the greater must be the incidence of infectious and, indeed, of other disease.

8. In all questions relating to housing the circumstances of the persons to be housed must be considered.

9. The operations of the Housing Sub-Committee from 1891–1901 did not, apparently, have the effect of increasing crowding in any class of habitation. Taken along with other operations, their effect was probably to stimulate the erection of dwellings.

10. These operations, if carefully carried out, are certain to improve the health of persons living in the altered dwellings.

11. An analysis, with sketch maps, is given of the circumstances of housing in four large districts, containing at the Census nearly 200,000 persons, and of the death-rates prevailing in those districts.

From this analysis it has been found possible to sub-divide the districts, and to select those in which the health conditions are worst.

12. The death-rate in four-roomed houses comes out unexpectedly high. In effect, these, as used, are very frequently overcrowded, and an effort should be made, as far as possible, to influence their mode of use.

13. The course of action at present pursued by the Committee in dealing with unhealthy dwellings must be regarded as a sound one.

WORK OF THE LADIES' PUBLIC HEALTH SOCIETY AND THE LADIES' SOCIETY FOR VISITING THE JEWISH POOR.

The table on page 250 shows what amount of work these Societies have done during the year 1906.

The work performed by these Societies for a number of years in teaching personal and household cleanliness in the poorer districts of the City has had a marked effect, and an improvement on former conditions can be discerned. The Medical Officer of Health desires to acknowledge the services rendered by the Lady Officers and District Lady Superintendents of the Societies in guiding and aiding the work of the Female Health Visitors.

From the table it will be seen that the Health Visitors have made 9,026 inspections of houses during the year in the course of systematic house-to-house visitation in their respective districts. They have also made 1,736 special enquiries in cases of death, and have laid 1,102 complaints as to insanitary conditions which they have detected in the course of their daily work.

They have distributed no fewer than 7,124 leaflets on the following matters :—

1. The Prevention of Diarrhœa.
2. The Prevention of Consumption.
3. Precautions against Measles.
4. Precautions against Whooping Cough.
5. Suggestions to Householders.
6. How Infants should be Fed, etc.

By the distribution of the leaflets and by personal instruction a system of educational work is constantly going on amongst the poor.

Disinfecting powder has been left at 6,356 houses.

The importance of cleanliness of the houses and person is steadily inculcated.

A summary of the work done by the Health Visitors under the supervision of the Ladies' Public Health Society and of the Medical Officer of Health is given in the following table:

Work of Female Health Visitors, Year ending 31st December, 1906.

(a) Ladies' Public Health Society.

DISTRICT	Number of Cottages in District	Houses Visited		Condition of Houses						No. of Houses containing Lodgers	Complaints requiring action by Sanitary Department	Sickness			Leaflets left at Houses	Disinfecting Powder left at Houses	Limewashing							Reports as to Children being Neglected (clothing, food, &c.)	Help Rendered	Death Cards	Average Death-rate, 1900-1-2
		First Visit	Not First	Dilapidated	Not Dilapidated	Clean	Dirty	Improved since last Visit	Not Improved	Overcrowded		Infectious	Non-Infectious	Total Sickness			Living and Bed Rooms	Kitchens	Yards	Closets	Cellars	Coal-places	Ceilings	Staircases		Help rendered includes :—Giving food, clothing, &c., advising mothers as to care and treatment of children, making of sick beds, cleaning houses for sick persons, obtaining recommends for Convalescents, &c		
1. Ancoats, West	1434	1	176	20	157	150	27	107	69	3	18	40	4	34	38	173	172	42	11	39	39	7	...	28	4	...	78	113	32·5
2. Ancoats, North	2137	...	383	41	342	287	96	90	293	...	50	38	7	59	66	318	235	24	19	30	27	7	1	42	2	1	72	132	29·1
3. Ancoats, Central	1021	247	440	46	641	576	111	54	386	3	41	16	22	94	116	539	571	26	9	13	12	5	2	11	3	2	33	59	32·7
4. Ancoats, South	1398	...	658	39	619	411	247	134	524	8	54	60	11	132	143	397	620	31	103	131	131	31	15	37	14	22	417	110	24·5
5. Ancoats, East	1166	...	551	113	438	391	160	114	437	4	124	83	11	92	103	551	551	26	22	49	47	5	4	28	7	5	219	79	24·3
6. London Road	1820	...	651	170	481	482	169	249	402	...	88	98	7	141	148	623	454	123	47	146	146	20	3	99	15	7	101	102	27·7
7. Deansgate	1705	...	385	7	378	217	168	91	294	5	105	44	11	87	98	215	193	43	29	34	36	4	17	8	16	1	132	109	34·6
8. St. George's, North	3052	...	257	12	245	242	15	38	219	1	14	49	3	11	14	62	123	4	1	5	5	...	...	...	1	...	51	131	...
9. St. George's, East	42	...	440	111	329	400	40	128	312	...	36	44	4	18	22	416	400	13	15	17	18	5	1	4	1	1	13	167	...
10. St. George's, Central	1422	...	320	52	268	253	67	79	241	11	75	65	7	23	30	198	188	114	27	37	38	2	1	69	60	7	42	72	...
11. Angel Meadow	1023	...	323	25	298	267	56	122	201	...	210	27	6	25	31	188	51	22	11	9	11	...	...	1	1	2	97	30	46·6
12. Chorlton-upon-Medlock, North	1808	...	484	...	484	441	43	100	384	...	58	30	6	86	92	570	474	31	21	55	55	10	1	19	3	...	276	112	...
13. Chorlton-upon-Medlock, South	893	53	442	42	453	478	17	73	369	1	87	79	7	36	43	671	393	12	54	72	72	23	...	7	1	...	160	128	...
14. Hulme, West	830	19	176	13	182	150	45	2	174	2	45	51	10	49	59	72	6	23	35	33	33	8	...	9	5	2	326	139	...
15. Hulme, Central	3288	11	279	76	214	206	84	16	263	3	30	45	6	46	52	132	5	15	3	6	5	...	2	11	2	3	60	142	...
16. Hulme, East	1134	465	27	59	433	369	123	16	11	2	60	82	17	41	58	374	9	11	18	37	16	8	...	22	3	6	35	111	...
Total	25552	796	5992	826	5962	5320	1468	1413	4579	43	1101	851	139	974	1113	5499	4445	560	425	713	691	135	47	395	138	59	2112	1736	...

(b) Ladies' Society for Visiting the Jewish Poor.

17. Red Bank	657	...	958	20	938	938	20	201	757	...	282	90	3	102	105	939	939	59	31	11	3	6	...	70	6	...	70	...	16·1
18. Strangeways	394	75	1205	46	1234	1186	94	95	1110	...	701	118	12	90	102	686	972	...	...	1	...	10	...	...	...	...	4	...	...
Total	1051	75	2163	66	2172	2124	114	296	1867	...	983	208	15	192	207	1625	1911	59	31	12	3	16	...	70	6	...	74	...	...
Grand Total	26603	871	8155	892	8134	7444	1582	1709	6446	43	2084	1059	154	1166	1320	7124	6356	619	456	725	694	151	47	465	144	59	2186	1736	...

Limewashing.—The Visitors supply brushes on loan, and give the necessary sanitary dry lime to tenants of houses who will undertake cleansing. During the year they have been enabled to get 3,301 rooms, yards, closets, etc., thoroughly cleansed and limewashed. To this portion of their work the Medical Officer of Health attaches great importance.

In the course of their daily visits they came across 109 cases of neglected children. The parents were warned in many instances, and others were reported to the Society for the Prevention of Cruelty to Children.

Help was rendered to 2,186 families in many ways, such as in food and clothing, advising mothers as to the management of their children, making the beds of sick patients and cleaning their houses, obtaining recommends for Convalescent Homes, and in the summer months arranging to send children into the country for a holiday, and to the Manchester Camps at Birkdale and St. Annes for Poor Children at the Seaside.

During the year they have been engaged in another very important work, viz., supervising the disinfection of houses in cases of Consumption, and seeing to their subsequent cleansing. At the end of the year they had 413 cases of Consumption under observation in their respective districts. It is their duty to report monthly as to whether the house is clean and free from dust and dirt, and every three months they see that a thorough cleansing of the house takes place, so as to keep down infective material as much as possible, viz.: the walls are rubbed down with dough, the floors and furniture washed, and the bed clothing and personal clothing of the patient washed in boiling water.

Very great importance attaches to the work which the Health Visitors are doing in the instruction of mothers in the procedures which they must adopt when artificially feeding their children.

They have received special practical training in the methods and precautions required in the preparation of foods and in the feeding of infants; and I hope that, in this way, the assistance given to mothers unable to suckle their children has been rendered more valuable.

I have pleasure in stating that Miss Eleanor Greg has undertaken on behalf of the Ladies' Public Health Society to supervise the work of the Health Visitors for the Medical Officer of Health. It is understood that she is to act under the instructions and be responsible to the Medical Officer of Health. Miss Greg holds the certificate of the Sanitary Institute, and will, I believe, improve the efficiency of the work.

MONSALL HOSPITAL.

Report for the Year 1906.

I submit the usual statistical tables dealing with the work done in Monsall Hospital during the year ending December 31st, 1906.

The first point on which I wish to comment is the number of patients admitted in a moribund condition, and dying, as a matter of fact, within 48 hours of admission. Of these there were 34, or 15·89 per cent. of the total deaths.

The only occasion on which it can be the least probable that recovery may result from the removal to hospital of a dying patient is in the case of one suffering from Laryngeal Diphtheria, when the timely performance of the operation of tracheotomy may save life.

Of the moribund cases this year, 13 were thus suffering from urgent obstruction to respiration. In the remainder it must have been, in my opinion, obvious that no good whatever could possibly accrue to the patient from removal to hospital, and it is probable that in many the disturbance necessitated by his removal to hospital may have accelerated his death. On the other hand, it is sometimes distinctly an advantage that the death shall not take place in a particular house or in the practice of the certifying medical attendant, and it is without doubt that for this reason removal to hospital is sometimes requested. Distinct harm may moreover result from this practice to other patients suffering from that particular disease in whose interests removal to hospital may be beneficial, but be refused by the relatives because a previous patient has died in hospital. Also, the faith of the general public in methods of treatment adopted at the hospital may be unjustifiably shaken.

The daily average of patients remained about the same as the previous year.

The increase in the number of patients suffering from Puerperal Fever, which was evident last year, has been maintained, and there can be little doubt that the treatment of this disease will in future form an important part of the routine of the hospital. This work has been undertaken without any addition to the medical or nursing staff.

The work done in the hospital laboratory, the details of which are described by Dr. M. B. Arnold, Senior Assistant Medical Officer, has been found most useful clinically, and I would point out that in an isolation hospital it is essential that the internal bacteriological work shall be done on the premises. In a large number of instances an accurate diagnosis is impossible without a bacteriological examination, and a number of beds available for isolation purposes in any large

hospital is not sufficient to enable a case to be secluded until the result of such an examination has been obtained from an outside laboratory. In many cases positive evidence of the presence of the Diphtheria bacillus, for instance, has been obtained from the examination of a film preparation, which can be made in five minutes.

There can be no doubt that the very small incidence of cross infection in this hospital is largely due to the presence of a well-equipped laboratory in the hospital grounds.

The working expenses of even a large laboratory are very small when the necessary media are made on the premises. At Monsall, much valuable assistance in this respect has been rendered by the Dispenser, Mr. T. Nicholson, whose knowledge of laboratory technique is very sound.

The proportion of sickness amongst the staff has been low, which is no doubt due to the fact that a somewhat rigorous medical examination is made of every nurse and domestic servant before her engagement, and that no probationer nurse who shows any signs of constitutional weakness during the first three months is accepted for further training.

During 1906, 9 nurses contracted Scarlet Fever, 3 Diphtheria, and 4 Enteric Fever. Amongst the domestic staff, 1 contracted Enteric Fever and 1 Scarlet Fever. All recovered, and were able to resume their duties.

For the post of ward sister, 185 applications were received during 1906, of which 9 were accepted. There were 361 applications for the post of probationer nurse: of these, 173 candidates were so obviously unsuitable—usually on account of their being insufficiently educated—that their applications were not entertained.

To the remaining 188 the usual forms were sent, describing in general the duties of a nurse; only a small proportion then persisted in their candidature; and ultimately 49 were accepted for training: of these, again, 12 were found unsuitable in the first three months, and 4 resigned.

I am of opinion that the question of nursing in an isolation hospital is of more importance than is often supposed. At Monsall great pains are taken to secure suitable candidates, and to train them not only in the practice of nursing but also by lectures on anatomy, physiology, and the elements of medicine and surgery. This course lasts for two years, and at the end of that period only those who have done exceptionally well are retained on the staff.

Unqualified nurses, who have received a partial training elsewhere, are not employed at Monsall unless they enter as probationers, and go through the

usual routine. I feel sure that the proper place of the fever hospital in the training of a nurse is at the beginning and not at the end of the curriculum.

There is a tendency amongst qualified nurses who have just completed their three or four years' general training to come to isolation hospitals for a period of six months, nominally to learn, in practice, to obtain a certificate that they know the treatment of infectious diseases. Such candidates are, as a rule, of little value to the hospital, inasmuch as they are often unwilling to work themselves and unable to show others how to do so.

If, or I may perhaps say when, the registration of nurses by the State is effected, it is to be hoped that fever training will be recognised as a preliminary and not as an addition to general work. The fact that the minimum period for which probationer nurses are accepted for training at Monsall is two years is, in my opinion, of great advantage to the hospital, in that it enables us to eliminate those who are only taking up nursing temporarily, and do not intend to make it their life's work.

PUERPERAL FEVER (1).

During the year 1906, 49 patients have been discharged who had suffered from Puerperal Fever. The clinical study of these cases has elicited some facts which are interesting from the surgical point of view, but on this aspect of the matter I do not intend to dwell in this report.

I append a table showing some of the salient features of each case, and on which I propose to comment briefly as follows :—

(1) *The results.*—There is a gross mortality of 12 cases, or 24·4 per cent. Of these, four were moribund on admission, and died within 24 hours of their arrival. Of the remaining eight, one died from an attack of Pneumonia, which commenced six weeks after admission, and had no apparent connection with the original illness. In only two instances was the patient not obviously in danger of her life on admission.

The average interval elapsing between the calling in of the doctor by the midwife, or (in cases where he was in attendance from the confinement) from the onset of the fever, to the notification of the case was four and a half days. In other words, what is admittedly the most important part of the illness from the point of view of treatment had passed before the patient was admitted.

With regard to those discharged as cured, it is necessary to observe that they were all detained until they were free from pelvic pain on exertion ; the average duration of this detention was, in the case of the recoveries, 60 days. Any operation that was necessary for the treatment of the consequences of the puerperal infection was performed before the patient left Monsall.

(2) *The cause of the illness.*—The cases have been divided into those attended at the confinement by a medical man, by a midwife, and by neither. The

"doctors'" cases are 28 in number, and the "midwives'" 16. It does not, however, follow that in all cases where the doctor was in attendance that he was responsible for the infection, for in many of these a nurse of some sort or other was present too, and probably made internal examinations. From other considerations, it is probable that the incubation period of puerperal sepsis does not exceed 48 hours, so, where this interval had elapsed between the last examination of the doctor and the initial rigor or rise of temperature, the doctor must be held blameless—except, perhaps, in so far as his responsibility for the acts of the nurse goes.

In 11 of the 28 cases there was a history of the use of forceps, combined with clinical evidence of a variety of laceration of the parts which could not have been caused by natural means alone.

In the "Doctors'" cases the onset of the pyrexia occurred within 48 hours in eight instances, and the average length of the latent period was three days. In two only of the "Midwives'" cases was the onset within 48 hours, and the average length was four-and-a-half days.

It would appear, then, that in the bulk of the "midwives'" cases the infection took place during the puerperium, and not at the time of delivery. The factors that suggest themselves here are the neglect to adequately protect the genitalia after delivery and the use of vaginal douches. It is not necessary that these latter should have been given with a dirty instrument.

From the clinical point of view, I am strongly of the opinion that midwives should not be allowed to use the vaginal douche except under the direction of a medical man. In point of fact, the conditions under which vaginal douching might be necessary are covered by those in which she is, under the regulations, obliged to summon medical aid.

(3) *The bacteriology of the cases.*—In every instance a bacteriological examination was made in the hospital laboratory of the contents of the uterus, the results of which were as follows:—Streptococci were present in 29 cases; bacillus coli communis was present also in five of the streptococcal cases, and in one case it was the only organism present. Gonococci were found alone in two cases, and staphylococci in one case. In one other instance, a bacillus was present the nature of which was not fully determined. In 15 there was either no growth on the tubes or some suspicion of vaginal contamination having occurred in the swab.

In 27 instances blood withdrawn from the basilic vein was examined also. This was apparently sterile in 19 cases, while streptococci were present in eight. The proportion of cases in which streptococci were found is this year greater than heretofore, while bacillus coli occurred less frequently. It is possible that this may be due to the fact that in former years the proportion of midwives' cases admitted has been higher. To settle this point, it would be necessary to

examine a larger number of cases, and not only those which have been admitted to hospital. At Monsall we do not see the milder varieties of puerperal infection.

(4) *The nature of the lesion.*—There were 18 cases of retention of placenta or membranes, with one death. The illness was apparently due to injuries from the use of instruments in seven cases, all of which recovered. General peritonitis was present (on admission) in eight cases, with four deaths; all were treated by laparotomy. Pelvic suppuration was present (but shut off by adhesions from the general peritoneal cavity) in three cases on admission—all fatal. This does not include those cases in which this complication occurred in the convalescent period, in which the results were much better. There was a condition of general septicæmia, without obvious lesion, in 13 cases, with four deaths: in all probability, some of these were suffering from septic endometritis, but until a satisfactory definition of that condition is produced, I think it better not to label these cases at all.

(5) *The treatment adopted.*—In all but eight cases the uterus was curetted on admission with a sharp curette of special construction, followed by a rubbing of the raw surface with swabs soaked in undiluted izal fluid. The uterine cavity was then packed with izal gauze. Vaginal douching was not employed at all, nor intrauterine douching, except when the hæmorrhage from curetting was severe. Extirpation of the uterus was tried as a last resort in three instances, but without success. Of the method employed elsewhere of removing the uterus before the patient becomes dangerously ill, I have not had any experience. Laparotomy, apart from hysterectomy, was performed for one purpose or another in 14 cases, with four deaths.

Antistreptococcic serum was given in 20 cases, in 16 of which streptococci were found in the uterus, and in the blood also in five cases. The dose was either 50 or 100 cubic centimetres.

It is only necessary to add that the admission of cases of Puerperal Fever to an isolation hospital is a great strain on the nursing staff. At Monsall this work has been performed without any addition to the staff, and that often at times when the accommodation of the hospital has been severely taxed by epidemics of other diseases.

SCARLET FEVER.

The total number of cases of Scarlet Fever treated this year exceeds the figure for 1905 by 500, while there were 35 more deaths, the mortality being 1 per cent. higher. More than twice as many deaths, however, took place within 48 hours of admission.

The duration of the average stay in hospital is, however, much lower, being nearly a fortnight less. This figure does, as it happens, express a clinical as well as an arithmetical fact, for an attempt was made at the beginning of 1906

to discharge the average case of Scarlet Fever at the end of four weeks instead of six as heretofore, the difference being that formerly patients were, as a rule, detained until desquamation had ceased entirely (though I have never held that late desquamation was *per se* infectious), while in 1906 the majority were still peeling on the fingers and toes when they left hospital.

When the hospital was full, and in consequence a larger proportion of patients were admitted later in the course of the disease than usual, it was quite apparent that such complications as Otorrhœa, Adenitis, and Nephritis supervened more frequently than amongst cases of a like degree of severity which had been admitted earlier in their illness.

On recording the complication incidence for cases admitted on and after the sixth day, we, however, find that this is for all complications (and especially for Otorrhœa) much lower in the early admissions.

This affords a very good instance of the apparent failure of the statistical method when applied to clinical medicine. The reason why the incidence of these complications, and also the death-rate, is higher than in those admitted early, is undoubtedly the fact that, as a rule, these have the disease in a more severe form. The milder type of case is usually left at home unless there is a reason for removal on account of its surroundings, while the severe type is sent to hospital early for treatment. It is not possible statistically to compare the complication incidences with groups of cases of the same severity admitted early and late respectively.

I am certainly of the opinion that the proportion of both septic and toxic cases has been higher in 1906 than in 1905.

Turning now to the records for all cases, we find that the Otorrhœa rate is slightly lower than in 1905, while the incidence of Rhinitis has markedly diminished. Bearing in mind that the nose of every patient in hospital is irrigated with tap-water at least once every day, it is obvious that the use of the nasal douche does not, in itself, set up Rhinitis.

When, however, chemical disinfectants of various types were employed the proportion of Rhinitis was very much higher, being in 1904 24·6 per cent.

There has been apparently a marked increase in Albuminuria, but this is, I think, mainly due to the introduction of more accurate methods of testing the urine, and may be also due to more careful recording in the wards assigned to one of the Assistant Medical Officers, who was working specially on this subject.

The incidence of Nephritis and of other complications has been, as formerly, very low. The importance of this will be evident when it is realised that it is the complications of Scarlet Fever that matter. Provided that the patient

survives the acute stage of the disease, and does not contract one if its complications, he leaves hospital none the worse for his illness. In the case of children from bad homes, or in those who have been unwisely or insufficiently fed, an attack of Scarlet Fever is often an unmixed blessing.

The ear complications of Scarlet Fever deserve some special mention. As previously pointed out, I am strongly of the opinion that no patient of the poorer classes at all events should be discharged from hospital with a running ear if this can be avoided.

Scarcely ever, in my experience, do the patients follow the advice (which is at Monsall given in the form of printed directions, when children with Otorrhœa cannot be detained for further treatment) to take the child to a Doctor or the Ear Hospital forthwith. When the almost inevitable serious illness supervenes on this neglect, it is often too late, and death occurs from Septicæmia or from Cerebral extension.

During the year 1906 it was not possible to detain every such patient in hospital owing to the pressure on our accommodation, and I regret to say that several cases were sent home suffering from Otorrhœa.

When Otorrhoea occurs in a scarlatinal patient, the ear is examined in a good light in a special room well supplied with the necessary appliances, and intratympanic treatment on the usual lines is commenced; this resulted in a cessation of the discharge and an apparent cure in about 85 per cent. of all cases. In the remaining 15 per cent. which did not react to this treatment, prolonged for about two months as a rule, the middle ear was cleared of its contents and the mastoid process freed from carious bone by the radical mastoid operation.

In 1906 this procedure was adopted in 36 cases. In every instance the wound healed, and the patient left hospital with improved hearing and with ears free from discharge. In each of these cases, the operation was performed for the cure of Chronic Otorrhœa only. Occasionally, however, the bone adjoining the ear is affected in the acute stage of Scarlet Fever; an operation then becomes necessary. For this reason a greater or less amount of carious bone was removed from the mastoid process in 32 cases during 1906. In none of these, however, did the operation extend to the tympanic cavity.

The incidence of Post-Scarlatinal Diphtheria is again very low (0·5 per cent). One patient, however, I regret to say, died. I am, as before, inclined to attribute the very small amount of this superadded infection to the frequency with which bacteriological examinations are made in the hospital laboratory, and to the carefulness with which instructions to nurses in regard to the preservation of asepsis in their treatment of the throats is carried out. The use of rubber gloves is important in this connection.

ENTERIC FEVER.

There has been no change in the routine treatment of cases of Enteric Fever during the past year. As before, it has been the custom to feed patients on carefully-prepared solid food during the acute stage whenever they could digest this.

The duration of the average stay in hospital is slightly lower than that of 1905.

Three deaths occurred within 48 hours of admission, and the total mortality, is higher by 3 per cent.

Of the complications, the incidence of hæmorrhage of the bowel is higher while that of the others remain essentially unaltered.

Of the eight cases in which perforation of the bowel occurred, the abdomen was opened and the perforation sewn up in 6 : one recovered.

No less than 158 cases, or about two-thirds, were admitted after the tenth day of their illness, and three-fourths of the total number of deaths occurred in such patients. It is to be feared that this will continue to be the case as long as the isolation hospital is regarded by the medical profession generally as existing for the treatment of the surroundings and circumstances of the patient only, and not for that of the disease also.

In 32 per cent. of all cases and in 25 per cent. of those who subsequently died, the interval that elapsed between the first calling in of the Doctor and the removal of the patient to hospital was over 10 days. As far as could be ascertained, the nursing was obviously inadequate in all of these cases before their admission. These figures, however, show a marked improvement on those for 1905.

One reason which is often given for this delay is the difficulty (which undoubtedly exists) in the diagnosis of Enteric Fever. Whilst I am fully aware of the many advantages of the serum test in this connection, I am equally certain that one important limitation of its usefulness is not recognised as frequently as it should be, viz. : that a negative result obtained before the 10th day of disease does not show that the patient is not suffering from Enteric Fever, and is practically valueless. Very often, in conversation with medical men, I have heard it stated that as the serum test was negative in this stage of the disease they thought the patient was not suffering from Enteric Fever.

ERYSIPELAS AND CELLULITIS.

Only 66 cases of this disease—for the difference is one of site only, and not of the infecting organism—were admitted, and the death-rate was 9·1 per cent. All but one of the deaths occurred in cases of Cellulitis from wound infection, and in these the patients were in very obvious need of operative treatment on their admission.

OTHER DISEASES.

In this class are included cases which were not considered to be suffering from an infectious disease at all. The percentage of error is, in the case of Scarlet Fever 3·8 per cent., Diphtheria 8·6 per cent., and Enteric Fever 11·6 per cent.

In many, an accurate diagnosis was only possible after the patient had been under observation for several days, or had been submitted to careful bacteriological examination.

This does not include eight cases of Scarlet Fever which were certified as Diphtheria, and five cases of Diphtheria certified as Scarlet Fever.

It is to be remembered that it is often in the best interests, both of the patient and of his surroundings, that he should be forthwith removed to hospital, whether the original diagnosis be subsequently confirmed or not.

A. Knyvett Gordon,

Medical Superintendent.

DIPHTHERIA.

In the year 1906 there were 233 cases of Diphtheria admitted to the hospital as compared with 326 in 1905.

The case mortality was 19·3, slightly less than the previous year. Considering the extraordinary proportion (57 or 24·4 per cent.) of cases which required tracheotomy, this death-rate may be deemed satisfactory so far as hospital treatment is concerned.

When, however, it is remembered that though cases were received at all stages of the disease none which were admitted without laryngeal stridor developed any laryngeal trouble later, it must be considered that had treatment been begun early in all cases the number requiring tracheotomy would have been reduced almost to zero.

It cannot be too often reiterated that antitoxin given early almost certainly wards off the most serious form of Diphtheria. Until recently it could probably be fairly charged against the medical profession that its members hesitated to use antitoxic serum in the early stages of the disease. Probably, however, at present, the avoidable loss of infant life from delay in treatment of Diphtheria

is to be attributed largely to the ignorance and carelessness of the parents, which lead so often to a medical man being called in too late. I append a table drawn up showing the difference in the death-rate between cases seen by a Doctor on the first day of illness and those seen later. The table shows (as was the case last year) a well-marked difference. Taking the tables of both years, the figures give a death-rate of 11·4 in cases seen by a Doctor on the first day of observed illness, and a death-rate of 23·1 in cases seen later. It should be mentioned that "first day" in this table means the actual day, not the 24 hours following the observation of illness.

It would seem, therefore, from the hospital statistics, that the time is not far distant when the most urgent problem in dealing with Diphtheria will be the education of the guardians of the children, so that they may seek medical advice more promptly.

One may perhaps record here that salts of citric acid have been given to many cases during the year. It is known, and indeed must have been noticed by anyone collecting specimens of the blood of Diphtheria patients, that the coagulation time of the blood is much reduced in the disease. As the citrates are known to decrease the coagulability of the blood, the salts were given to many patients. The treatment is admittedly symptomatic, but appeared to give excellent results when continued for some time, especially in hastening convalescence. It is, of course, too soon to tabulate results of this treatment.

A question of practical and of scientific interest which is much discussed at present is the alteration in the serum reaction following a second injection of antitoxic serum. Some cases with rather alarming symptoms have been recorded.

There can, of course, be no doubt that in the great majority of cases the serum reaction following a second injection of serum does not differ in any marked degree from the reaction following a first dose. There is, however, a certain very small proportion in which the second serum reaction follows the injection in a very short time, and is much more marked than the first. All cases receiving a second dose have been especially carefully observed, but only in two instances could the reaction be considered unusual.

Pirquet and Schick have surveyed the whole subject very carefully with reference to possibly dangerous reactions, and I think that their conclusions may be considered reassuring. There is certainly no evidence that should make one hesitate in the therapeutic use of serum if a second administration seems desirable on clinical grounds.

MONSALL HOSPITAL LABORATORY.

REPORT FOR 1906.

During the year, 7135 bacteriological specimens were examined, of which 352 were found to have bacilli present morphologically indistinguishable from the Diphtheria bacillus.

In connection with this work, there is a heavy expense incurred in the purchase of the necessary culture tubes. As the result of experiments conducted it has been found possible to produce here satisfactory culture tubes at a small cost, and probably more than one hundred pounds will be saved during the next year in this item alone. Our experience has continued to prove the great value of frequent bacteriological examination in doubtful cases.

On several occasions, laboratory results have enabled measures for the isolation of patients to be taken more completely than would have been justifiable from clinical observations alone.

The laboratory having been furnished with a water-driven centrifuge, it has been more readily possible to take observations of the opsonic indices of patients. This work has not, so far as I am aware, been done previously in connection with the acute specific fevers.

During the year, work on Nephritis in Scarlatina and also on the Differentiation of "Diphtheroid" Bacilli has been completed, which will shortly be published.

As an appendix to this report one may perhaps be permitted to record an experiment made with flies during the summer of 1906. Three hundred flies were captured alive: they were all marked with a spot of white enamel on the back of the thorax and liberated. It had been previously shown, by keeping imprisoned a few so marked, that the energy of the fly was not affected and the mark did not wear off rapidly.

The flies were all liberated from a window of the administrative block, and instructions were issued that the fly-traps in the wards were to be watched for the marked flies. Out of the 300, five were recovered at distances varying from about 30 to 190 yards. The liberations were always in fine weather, and the recoveries were within five days.

M. B. Arnold, M.D., D.P.H.,

Senior Assistant Medical Officer.

CASES OF PUERPERAL FEVER DISCHARGED DURING 1906.

No.	Initials	Day of onset of Fever	Day of disease on admission	Days elapsing between calling in of Doctor and Admission to Hospital	Doctor or Midwife	Forceps	Curetting of Uterus	Other Operations	Serum	Bacteriology of Uterus	Bacteriology of Blood	Complications	Days in Hospital	Result
1	E.M.	2	3	..	Dr.	No	Yes	Incision of Pelvic abscesses	Yes	Bacillus Coli Communis, Streptococci	Not examined	.....	218	Recovered
2	M.J.	3	6	..	Dr.	No	Yes	Incision of Pelvic abscess	Yes	Streptococci	Not examined	.....	136	Recovered
3	E.B.	3	4	..	Dr.	No	No	Laparotomy	No	Bacillus Coli Communis, Streptococci	Not examined	Severe injuries and general Peritonitis from instrumental dilatation	95	Recovered
4	E.C.	4	3	Same day	M.	No	Yes	.....	Yes	Bacillus Coli Communis, Streptococci	Not examined	.....	38	Recovered
5	A.P.	1	2	..	Dr.	No	Yes	.....	Yes	No growth	Not examined	.....	36	Recovered
6	S.A.C.	4	3	2	M.	..	Yes	.....	No	No growth	Not examined	.....	25	Recovered
7	B.B.	5	5	2	M.	..	No	Laparotomy	No	Gonococcus	Not examined	General Peritonitis (on admission)	81	Recovered
8	M.T.L.	5	5	4	M.	..	Yes	.....	No	No growth	Not examined	.....	39	Recovered
9	M.A.	6	4	2	M.	..	Yes	.....	No	Staphylococci	Not examined	.....	39	Recovered
10	E.B.	4	2	..	Dr.	No	Yes	Laparotomy (on admission)	Yes	Streptococci (+ a bacillus of the coli group)	Not examined	Intestinal obstruction also (on admission)	51	Recovered
11	S.C.	7	3	4	M.	..	Yes	.....	Yes	No growth	Not examined	.....	30	Recovered
12	M.H.	6	3	2	M.	..	Yes	Vaginal Hysterectomy	No	No growth	Not examined	.....	5	Died
13	F.H.	2	4	..	Dr.	Yes	Yes	.....	Yes	Streptococci	Streptococci	.....	48	Recovered
14	M.R.	2	4	..	Dr.	No	No	.....	Yes	Streptococci	Not examined	Extensive laceration from manual extraction of placenta	47	Recovered
15	R.H.	7	6	..	Dr.	No	No	Laparotomy	No	Streptococci (+ Bacillus Coli Communis)	Streptococci	General Peritonitis (on admission)	1	Died (24 hours)
16	C.W.	4	3	3	M.	..	Yes	.....	No	No growth	Sterile	.....	2	Died (48 hours)
17	M.D.	3	4	..	Dr.	No	Yes	.....	Yes	Streptococci	Streptococci	Late Pneumonia	58	Died
18	M.T.H.	2	4	3	Neither	..	No	.....	No	Gonococci + Streptococci	Not examined	General Peritonitis (on admission)	½	Died (12 hours)
19	F.E.M.	5	7	..	Dr.	No	Yes	.....	Yes	Streptococci	Streptococci	.....	50	Recovered
20	L.B.	4	9	..	Dr.	No	No	Laparotomy	No	.....	Not examined	General Peritonitis (on admission)	68	Recovered
21	A.A.	3	3	2	M.	No	Yes	Vaginal Hysterectomy	Yes	Streptococci	Not examined	.....	11	Died
22	M.P.	11	8	8	M.	No	Yes	Laparotomy	No	.....	Not examined	General Peritonitis (on admission)	79	Recovered
23	J.C.	3	5	..	Dr.	Yes	Yes	Laparotomy	Yes	Streptococci	Streptococci	Pyosulpina	60	Recovered
24	E.H.	4	3	..	Dr.	No	Yes	.....	Yes	Streptococci	Not examined	.....	34	Recovered
25	E.H.	8	3	11	Neither	No	Yes	.....	No	.....	Not examined	.....	24	Recovered
26	M.G.	2	3	2	M.	No	Yes	.....	No	Streptococci	Not examined	.....	28	Recovered
27	M.C.	2	2	..	Dr.	Yes	Yes	Laparotomy	Yes	Streptococci	Streptococci	General Peritonitis (on admission)	76	Recovered
28	M.L.	2	10	..	Dr.	Yes	Yes	Vaginal section	No	.....	Not examined	Pelvic abscess	1	Died (24 hours)
29	M.O.	5	6	..	Dr.	Yes	Yes	.....	Yes	Bacillus Coli Communis	Sterile	Pyæmia	97	Recovered
30	B.D.	5	2	4	M.	No	Yes	.....	No	Streptococci	Sterile	.....	26	Recovered
31	B.M.	3	7	..	Dr.	No	Yes	Abdominal Hysterectomy	No	Streptococci	Sterile	General Pelvic Suppuration	6	Died
32	E.F.	5	2	2	Neither	No	Yes	.....	No	Streptococci	Sterile	.....	18	Recovered
33	M.S.	1	6	..	Dr.	No	Yes	Laparotomy	No	Streptococci	Streptococci	General Pelvic Suppuration	3	Died
34	F.C.	4	3	..	Dr.	No	Yes	Laparotomy	No	Streptococci	Streptococci	General Pelvic Suppuration	3	Died
35	L.G.	4	5	..	Dr.	Yes	Yes	Laparotomy	Yes	Streptococci	Sterile	Large Pyosalpinx	75	Recovered
36	M.E.H.	7	5	2	Neither	No	Yes	Laparotomy	Yes	.....	Sterile	Pelvic Suppuration	45	Recovered
37	E.S.	2	4	..	Dr.	Yes	No	Laparotomy	No	Streptococci	Sterile	.....	½	Died (12 hours)
38	H.P.	4	2	1	Neither	No	Yes	.....	No	.....	Sterile	.....	19	Recovered
39	E.H.	6	3	..	Dr.	Yes	Yes	.....	No	Streptococci	Sterile	.....	40	Recovered
40	M.B.	7	2	..	Dr.	Yes	Yes	.....	No	Streptococci	Sterile	.....	32	Recovered
41	E.S.	3	2	1	M.	No	Yes	.....	No	Streptococci	Sterile	.....	30	Recovered
42	E.H.	3	6	5	M.	No	Yes	.....	No	Streptococci	Sterile	.....	44	Recovered
43	M.S.	5	5	..	Dr.	No	Yes	.....	No	.....	Sterile	.....	49	Recovered
44	L.H.	3	13	..	Dr.	Yes	Yes	Pelvic incision	No	Streptococci (+ Bacillus Coli Communis)	Sterile	.....	54	Recovered
45	M.M.	4	4	..	Dr.	No	Yes	.....	Yes	.....	Sterile	.....	32	Recovered
46	M.C.	4	4	..	Dr.	No	Yes	.....	Yes	Streptococci (+ Bacillus Coli Communis)	Sterile	.....	32	Recovered
47	K.W.	6	3	7	M.	No	Yes	.....	No	A bacillus not identified	Sterile	.....	40	Recovered
48	M.J.W.	8	5	..	Dr.	Yes	Yes	.....	No	Streptococci	Sterile	.....	22	Recovered
49	C.R.	2	3	4	M.	No	No	Laparotomy	Yes	Streptococci	Not examined	General Peritonitis (on admission)	1	Died (24 hours)

Statistical Report for the Year 1905.

Remaining in Hospital January 1st, 1906	287
Patients admitted during 1906	2678
	2965

Discharged.

Cured and Died	2620
Remaining in Hospital December 31st, 1906	345
	2965

Total number of Deaths during 1906	214
Net Mortality	8·17%

Of the deaths, 34 occurred within 48 hours of admission = 15·89%

Daily Averages.

Patients	322·9
Officers, Nurses, and Servants	172·1
Average stay of Patients (in days)	45 3

Table showing Monthly Distribution of Diseases throughout the Year.

(A) *Admittances.*

1906	Scarlatina	Diphtheria	Enteric Fever	Erysipelas	Puerperal Fever	Other Diseases	Total	Daily Average Number of Patients in Hospital
January	139	17	26	10	3	5	200	274·1
February	145	20	26	6	10	20	227	318·5
March	110	16	10	4	2	18	160	323·6
April	103	23	3	3	1	11	144	269·2
May	136	7	6	6	2	14	171	274·0
June	160	22	4	6	4	11	207	280·8
July	170	20	14	6	0	15	225	351·5
August	175	18	9	2	4	21	229	334·2
September	181	24	27	5	4	10	251	348·1
October	163	22	51	6	9	9	260	378·7
November	248	22	46	10	8	6	340	372·9
December	196	25	21	6	3	13	264	349·2
Total	1926	236	243	70	50	153	2678	322 9

TABLE SHOWING MONTHLY DISTRIBUTION OF DISEASES THROUGHOUT THE YEAR—*continued.*

(B) *Discharges.*

1906	Scarlatina	Diphtheria	Enteric Fever	Erysipelas	Puerperal Fever	Other Diseases	Total
January ...	156	22	17	6	4	3	208
February ...	104	7	24	8	6	6	155
March	141	23	29	5	7	27	232
April	106	20	11	3	3	8	151
May	127	11	8	7	1	14	168
June	145	18	4	6	4	15	192
July	116	18	8	6	2	13	163
August	196	28	10	4	1	23	262
September...	158	12	8	2	5	10	195
October.....	174	18	29	6	2	13	242
November...	267	30	50	7	6	7	367
December ...	207	26	34	6	8	4	285
Total	*1897	233	232	66	49	143	2620

* Of these, 12 had Scarlatina and Diphtheria co-existent; 2 had Scarlatina and Morbilli co-existent; 1 had Scarlatina and Tubercular Meningitis co-existent.

TABLE SHOWING NUMBERS OF VARIOUS DISEASES TREATED.

DISEASE	Remaining in Hospital, Jan. 1st, 1906	Admitted during 1906	Dismissed, Cured, and Died during 1906	Remaining in Hospital, Dec. 31st, 1906
Scarlatina	216	1926	1897*	245
Diphtheria	29	236	233	32
Enteric Fever.....	25	243	232	36
Erysipelas	3	70	66	7
Puerperal Fever.....	6	50	49	7
Other Diseases	8	153	143	18
Total...	287	2678	2620	345

* Of these, 12 had Scarlatina and Diphtheria co-existent; 2 had Scarlatina and Morbilli co-existent; 1 had Scarlatina and Tubercular Meningitis co-existent.

Case Mortality for 1893-1906.

Year 1893	9·36	Year 1900	6·22
„ 1894	7·82	„ 1901	7·15
„ 1895	9·73	„ 1902	8·80
„ 1896	10·60	„ 1903	8·50
„ 1897	8·60	„ 1904	6·50
„ 1898	10·70	„ 1905	8·40
„ 1899	7·11	„ 1906	8·17

Year	Disease	Mortality per cent.	Year	Disease	Mortality per cent.
1890	Scarlatina	12·2	1890	Enteric fever	16·4
1891	Do.	6·9	1891	Do.	19·1
1892	Do.	9·1	1892	Do.	19·1
1893	Do.	6·9	1893	Do.	18·6
1894	Do.	4·4	1894	Do.	15·9
1895	Do.	7·1	1895	Do.	20·1
1896	Do.	8·5	1896	Do.	19·6
1897	Do.	6·1	1897	Do.	13·3
1898	Do.	6·7	1898	Do.	16·1
1899	Do.	3·6	1899	Do.	12·3
1900	Do.	4·6	1900	Do.	11·8
1901	Do.	4·7	1901	Do.	13·9
1902	Do.	6·1	1902	Do.	10·9
1903	Do.	4·7	1903	Do.	19·2
1904	Do.	3·3	1904	Do.	14·1
1905	Do.	3·6	1905	Do.	15·1
1906	Do.	4·5	1906	Do.	18·1

Scarlatina.

Age of Patients	MALE			FEMALE			TOTAL		
	Cases	Died	Mortality per cent.	Cases	Died	Mortality per cent	Cases	Died	Mortality per cent.
Under one year ...	7	...	...	1	...	...	8	...	...
1 to 2 years ...	21	6	28·6	20	2	10·0	41	8	19·5
2 to 3 „ ...	66	7	10·6	41	6	14·6	107	13	12·1
3 to 4 „ ...	75	9*	12·0	81	5	6·2	156	14	9·0
4 to 5 „ ...	89	6	6·7	76	5	6·6	165	11	6·7
5 to 10 „ ...	408	12	2·9	415	13†	3·1	823	25	3·0
10 to 15 „ ...	182	5	2·7	201	5	2·5	383	10	2·6
15 to 20 „ ...	62	...	...	66	1	1·5	128	1	0·8
20 to 25 „ ...	22	...	...	22	1	4·5	44	1	2·3
25 to 30 „ ...	9	...	...	13	...	...	22	0	...
Over 30 „ ...	13	2	15·4	7	...	...	20	2	10·0
Total	945	47	4·9	943	38	4·0	1897	85	4·5

* One Scarlatina and Tubercular Meningitis co-existent.

† One Scarlatina and Diphtheria co-existent.

Nine deaths occurred within 48 hours of admission.

SCARLATINA—*continued.*

Average stay in Hospital .....year 1901...55·8 days.
Do. do. .....year 1902...57·3 days.
Do. do. .....year 1903...53·8 days.
Do. do. .....year 1904...55·4 days.
Do. do. ....year 1905...63·3 days.
Do. do. .....year 1906...49·6 days.

Average stay in Convalescent Ward...year 1902...22·8 days.
Do. do. .....year 1903...23·0 days.
Do. do. .....year 1904...24·6 days.
Do. do. .....year 1905...24·2 days.
Do. do. .....year 1906...17·9 days.
Do. Acute Ward..... ..year 1902...34·5 days.
Do. do. .....year 1903...30·8 days.
Do. do. .....year 1904...30·8 days.
Do. do. .....year 1905...39·1 days.
Do. do. .....year 1906...31·7 days.

YEAR	No. of Scarlatinal Discharges	No. of Cases of Post Scarlatinal Diphtheria	Case Percentage	Died
1901	2669	104	3·9	3
1902	2018	29	1·4	1
1903	1877	8	0·4	2
1904	1560	7	0·4	0
1905	1499	13	0·9	0
1906	1897	10	0·5	[illegible]

PERCENTAGE COMPLICATIONS IN SCARLET FEVER, 1906.

Complication	No.	Percentage
Otorrhœa	373	19·7
Rhinorrhœa of Convalescence..	24	1·3
Nephritis	48	2·6
Albuminuria	124	6·5
Endocarditis	19	1·0
Adenitis of Convalescence	40	2·1

All patients with Diphtheria, and also all those suffering from Scarlet Fever, were examined for Diphtheria bacilli before being discharged from the hospital.

Scarlatina.

Patients admitted *before* the 6th day of disease.

Mortality Percentage.

No.	Deaths	Mortality Percentage
1268	63	5·0

Incidence Percentage of Complications in these Patients.

Complication	No.	Incidence Percentage
Otorrhœa	270	14·2
Rhinorrhœa of Convalescence	19	1·0
Nephritis	36	1·9
Albuminuria	91	4·8
Endocarditis	15	0·8
Adenitis of Convalescence	36	1·9

Scarlatina.

Patients admitted *on* or *after* the 6th day of disease.

Mortality Percentage.

No.	Deaths	Mortality Percentage
629	22	3·5

Incidence Percentage of Complications in these Patients.

Complication	No.	Incidence Percentage
Otorrhœa	103	5·4
Rhinorrhœa of Convalescence	5	0·3
Nephritis	12	0·7
Albuminuria	33	1·7
Endocarditis	4	0·2
Adenitis of Convalescence	4	0·2

Diphtheria.

Age of Patients	MALE			FEMALE			TOTAL		
	Cases	Died	Mortality per cent.	Cases	Died	Mortality per cent.	Cases	Died	Mortality per cent.
Under 1 year ...	8	5	62·5	1	1	100·0	9	6	66·7
1 to 2 years ...	14	8	57·1	5	1	20·0	19	9	47·4
2 ,, 3 ,, ..	11	1	9·0	15	5	33·3	26	6	23 1
3 ,, 4 ,, ...	11	1	9·0	12	6	50·0	23	7	30·4
4 ,, 5 ,, ...	17	...	...	18	3	16·7	35	3	8·6
5 ,, 10 ,, ...	46	8	17·4	40	5	12·5	86	13	15·1
10 ,, 15 ,, ...	10	...	...	13	...	...	23	...	...
15 ,, 20 ,, ...	2	...	...	2	1	50·0	4	1	25·0
20 ,, 25 ,, ...	0	...	...	4	...	...	4	...	...
25 ,, 30 ,, ...	1	...	...	0	...	...	1	...	...
Over 30 ,, ...	1	...	...	2	...	...	3	...	...
Total	121	23	19·0	112	22	19·6	233	45	19·3

Seventeen deaths occurred within 48 hours of admission.

DIPHTHERIA.

Average stay in Hospital, in days, year 1901, 31·8
Do. do. ,, 1902, 50·7
Do. do. ,, 1903, 34·1
Do. do. ,, 1904, 37·3
Do. do. ,, 1905, 41·6
Do. do. ,, 1906, 43·0

Diphtheria.

Table showing Day of Disease on Admission (all Cases).

Day of Disease on Admission	No.
1st Day	35
2nd ,, ...	41
3rd ,, ...	42
4th ,, ...	37
5th ,, ...	33
6th ,, ...	9
7th ,, ...	13
8th ,, ...	7
9th ,, ...	7
10th ,, ...	3
Over 10 Days	6
Total	233

Diphtheria.

Table showing day of Disease on Admission (Deaths only).

Day of Disease on Admission	No.
1st Day	7
2nd ,, ...	8
3rd ,, ...	6
4th ,, ...	9
5th ,, ...	7
6th ,, ...	1
7th ,, ...	1
8th ,, ...	2
9th ,, ...	2
10th ,, ...	0
Over 10 Days	2
Total	45

Diphtheria.

Table showing interval elapsing between Date when Patient was first seen by a Medical Man and the Date of Admission to Hospital.

	All Cases	Deaths
Sent in on same day	57	14
2nd day	75	17
3rd ,, ...	31	4
4th ,, ...	29	3
5th ,, ...	17	3
6th ,, ...	6	1
7th ,, ...	5	...
8th ,, ...	4	2
9th ,, ...	3	1
10th ,, ...	1	...
Over 10 days.....	5	...
Total	233	45

Complications in Diphtheria.

Complication	Number of Cases	Percentage
Otorrhœa	9	3·9
Rhinorrhœa	...	...
All forms of Paralysis	20	8·6
Cardiac Paralysis alone	11	4·7
Palate alone	9	3·9
Diaphragm alone	...	...
Laryngeal alone	...	...
Hæmorrhagic Diphtheria	1	0·4
Adenitis of Convalescence	...	...

Tracheotomy Cases.

Age of Patients	No. of Patients	Died	Mortality per cent.
Under 1 year	7	6	85·7
1 to 2 years	8	4	50·0
2 ,, 3 ,, ...	11	5	45·5
3 ,, 4 ,, ...	9	4	44·4
4 ,, 5 ,, ...	11	2	18·2
5 ,, 10 ,, ...	10	2	20·0
10 ,, 15 ,, ...	1	...	...
15 ,, 20 ,, ...	...	...	...
Total	57	23	40·4

Of these, 13 died within 48 hours of admission.

DAYS ILL before Doctor called in.	Ages under 3			Ages 3 to 6			Ages 6 to 9			Ages 9 and upwards		
	Cases	Deaths	Mortality	Cases	Deaths	Mortality	Cases	Deaths	Mortality	Cases	Deaths	Mortality
Doctor called in same day.....	12	4	33·3	24*	2	8·3	11	1	9·1	10	...	...
1	17	7	41·2	28	4	14·3	12	2	16·7	14	1	7·1
2	12	4	33·3	18	2	11·1	11	2	18·1	6	...	...
3	6	1	16·7	9	4	44·4	4	1	25·0	2	...	...
4	3	2	66·7	6	2	33·3	2	...	...	2	...	...
5	1	1	100·0	4	1	25·0	1	...	...	5	...	...
6 and upwards ...	3	2	66·7	2	1	50·0	1	...	...	3	...	...

In 4 cases (1 of which resulted in death) a Doctor was not seen.

* In 9 cases Tracheotomy was performed, 2 of which died (Mortality of Tracheotomy cases in this section=22·2 per cent.).

Diphtheria.

	Ages under 3			Ages 3 to 6			Ages 6 to 9			Ages 9 and upwards			All ages		
	Cases	Deaths	Mortality per cent.	Cases	Deaths	Mortality per cent.	Cases	Deaths	Mortality per cent.	Cases	Deaths	Mortality per cent.	Cases	Deaths	Mortality per cent.
Doctor called in *on* the first day	12	4	33·3	24	2	8·3	11	1	9·1	10	0	...	57	7	12.3
Doctor called in *after* the first day .	42	17	39·0	67	14	20·9	32	5	15·6	31	1	3·2	172	37	21·5

In 4 cases (one of which resulted in death) a Doctor was not seen.

Enteric Fever.

Age of Patients	MALE			FEMALE			TOTAL		
	Cases	Died	Mortality per cent.	Cases	Died	Mortality per cent.	Cases	Died	Mortality per cent.
Under one year ...	...	...	...	...	...	...	...	...	...
1 to 2 years ...	...	...	...	1	...	..	1	...	...
2 to 3 ,, ...	1	...	...	...	...	...	1	...	...
3 to 4 ,, ...	1	...	...	1	...	...	2	...	...
4 to 5 ,, ...	3	...	...	1	...	...	4	...	...
5 to 10 ,, ...	12	...	...	15	2	13·3	27	2	7·4
10 to 15 ,, ..	12	...	...	16	2	12·5	28	2	7·1
15 to 20 ,, ...	20	1	5·0	14	1	7·1	34	2	5·9
20 to 25 ,, ...	22	9	40·9	18	3	16·7	40	12	30·0
25 to 30 ,, ...	30	6	20·0	9	1	11·1	39	7	18·0
30 to 35 ,, ...	15	4	26·7	9	4	44·4	24	8	33·3
35 to 40 ,, ...	7	2	28·5	6	1	16·7	13	3	23·1
40 to 45 ,, ...	6	3	50·0	2	1	50·0	8	4	50·0
45 to 50 ,, ...	1	...	...	3	1	33·3	4	1	25·0
Over 50 ,, ...	3	...	...	4	1	25·0	7	1	14·3
Total...	133	25	18·8	99	17	17·2	232	42	18·0

Three deaths occurred within 48 hours of admission.

Enteric Fever.

Average stay, in days, in Hospital .....year 1901...40·8 days
Do. do. .....year 1902...47·8 days
Do. do. ... .year 1903...40·5 days
Do. do. .....year 1904...41·1 days
Do. do. .....year 1905...41·5 days.
Do. do. ....year 1906...37·6 days.

Percentage of Complications in Enteric Fever.

Complication	No.	Percentage	Complication	No.	Percentage
Pneumonia	6	2·6	Intestinal Hæmorrhage	12	5·2
Relapse	5	2·1	Perforation	8	3·4

Enteric Fever.

Table showing day of Disease on Admission (all Cases).

Day of Disease on Admission	No.
1st Day	0
2nd ,, ...	1
3rd ,, ...	5
4th ,, ...	4
5th ,, ...	0
6th ,, ...	17
7th ,, ...	13
8th ,, ...	9
9th ,, ...	14
10th ,, ...	11
Over 10 Days	158
Total	232

Enteric Fever.

Table showing day of Disease on Admission (Deaths only).

Day of Disease on Admission	No.
1st Day	...
2nd ,, ...	...
3rd ,, ...	1
4th ,, ...	...
5th ,, ...	...
6th ,, ...	4
7th ,, ...	3
8th ,, ...	1
9th ,, ...	2
10th ,, ...	1
Over 10 days.....	30
Total	42

TABLE SHOWING INTERVAL ELAPSING BETWEEN DATE WHEN PATIENT WAS FIRST SEEN BY A MEDICAL MAN AND THE DATE OF ADMISSION TO HOSPITAL.

	All Cases	Deaths
Sent in on same day	8	3
2nd Day	11	1
3rd ,,	18	4
4th ,,	16	4
5th ,,	22	6
6th ,,	16	3
7th ,,	22	2
8th ,,	20	5
9th ,,	9	2
10th ,,	14	1
Over 10 days	76	11
Total	232	42

ERYSIPELAS AND CELLULITIS.

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Cases	Died	Mortality per cent.	Cases	Died	Mortality per cent.	Cases	Died	Mortality per cent.
Under 5 years	4	1	25·0	3	1	33·3	7	2	28·6
5 to 10 ,,	2	...	...	...	...	...	2	...	...
10 to 15 ,,	1	1	100·0	1	...	...	2	1	50·0
15 to 20 ,,	4	...	...	3	...	...	7	...	...
20 to 25 ,,	1	...	...	2	1	50·0	3	1	33·3
25 to 30 ,,	4	...	...	5	...	...	9	...	...
30 to 35 ,,	5	...	...	2	...	...	7	...	...
35 to 40 ,,	2	...	...	3	...	...	5	...	...
40 to 45 ,,	4	1	25·0	4	...	...	8	1	12·5
45 to 50 ,,	4	...	...	1	1	100·0	5	1	20·0
Over 50 ,,	7	...	...	4	...	...	11	...	...
Total...	38	3	7·9	28	3	10·7	66	6	9·1

Other Diseases.

Certified as	Actual Disease	No.	Certified as	Actual Disease	No.
Scarlatina.....	Tonsillitis	22	Enteric Fever..	Gastritis.....	2
,, ...	No obvious disease	14	,, ...	Phthisis	2
,, ...	Measles	12	,, ...	Tuberculosis ...	2
,, ...	Erythema	7	,, ...	Diarrhœa	1
,, ...	Rötheln	3	,, ...	Mastoid Abscess	1
,, ...	Pneumonia ...	2	,, ..	No obvious Disease	1
,, ...	Appendicitis ...	1	,, ...	Rheumatism ...	1
,, ...	Bronchitis	1	,, ...	Ulcerative Endocarditis	1
,, ...	Febricula	1	Measles	.....	9
,, ...	Gastritis.....	1	Sent in with Mother ...	.....	5
,, ...	Morbus Cordis	1	Phthisis	.....	2
,, ...	Nephritis	1	Puerperal Fever	Appendicitis ...	1
,, ...	Rhinitis	1	,, ...	Pneumonia ...	1
,, ...	Tonsillitis and Pleurisy.....	1	,, ...	Rheumatism (Acute)	1
,, ...	Tubercular Meningitis	1	,, ...	Ulcerative Endocarditis	1
,, ...	Urticuria	1	Erysipelas ...	Dental Abscess.	1
,, ...	Whooping Cough	1	,, ...	Mastoid Abscess	1
Diphtheria ...	Tonsillitis	12	,, ...	Oedema of Leg	1
,, ...	Measles	6	Burns	.....	1
,, ...	Pneumonia ...	1	Typhus	Measles	1
,, ...	Whooping Cough	1			
Enteric Fever..	Pneumonia ...	8			
,, ...	Enteritis	6			
,, ...	Appendicitis ...	2			

In the other diseases there were 24 deaths, 1 of which occurred within 48 hours of admission. Total mortality of other diseases, 16·8 per cent.

BAGULEY SANATORIUM FOR INFECTIOUS DISEASES.

Medical Superintendent's Report.

During the year ending December 31st, 1906, 520 patients were under treatment in this hospital; of these, 77 were remaining in hospital on January 1st, 1906, and 443 were admitted during the year. The following tables will show the distribution of these cases according to the disease from which each suffered and the district from which they came, and will give, in tabulated form, the result of the treatment that they received here.

Before proceeding to the statistical portion of this report, I wish to mention some of the many matters which have received the attention of the Committee since this hospital came under the jurisdiction of the Corporation of Manchester in November, 1904.

The original underground telephone service having proved itself later to be unreliable, the Committee, realizing the need for easy, rapid, and reliable communication between the wards and the Medical Officer, and learning from expert evidence that the setting right of the existing telephone service would be much more difficult and costly than the erection of a new one, sanctioned the fitting up of an overhead system of telephones throughout the hospital. This is worked during the day-time through an exchange in the Gatekeeper's Lodge, and by a system of switches and a cable the exchange is transferred during the night to the room of the Night Superintendent of Nurses. The system here has been in use for a year and a half, and has been uniformly reliable. It speaks well for the efficiency of the work when one mentions that, in spite of the very high winds that prevail here for many months in the year, twice only has a wire broken.

Various defects in the steam-heating apparatus showed themselves, and the whole system was overhauled and repaired where necessary; there has been no leakage from that day to this.

The outside painting of the establishment has been commenced, and has been calculated to spread over a period of four years; the lodge and the administration block, with their appurtenances, were painted last year.

The Farm-house, called "Baguley Lodge," standing in one corner of this estate, being in a very unstable and insanitary condition, has been demolished, but some of the out-buildings which were in good condition have been preserved, and will prove of value later.

In view of a new Agreement with the Bucklow Joint Hospital Board (coming into force on April 1st, 1907), whereby this hospital will be required to supply 45 beds if required, instead of 35 as at present, and will be required to fetch into hospital all cases of Scarlet Fever and Diphtheria that the Board may desire to send in, and to fetch away for disinfection, and return to the house, all clothing, bedding, etc., and to disinfect the same, the Committee have decided to build certain extra buildings adjoining the present stable-yard. These include ambulance and cart sheds, a workshop, and a mess-room for the male staff.

The above very brief and incomplete resumé of some of the chief matters recently undertaken here by the Committee will probably be sufficient to show that every effort is being made by those responsible to maintain this hospital in a state of the highest efficiency, ready at any time to deal with such work as may fall to its lot.

An instance of the necessity for having the hospital in such a state of efficiency occurred during the autumn and winter of 1906, when it was found necessary to fill this hospital with patients from Manchester. The number of patients under treatment rose suddenly from about 50 to well over 100, and this sudden rush could hardly have been satisfactorily dealt with unless the working arrangements of the hospital had been in satisfactory condition.

Mention has been made above of the new Agreement with the Bucklow Joint Hospital Board. One clause in this provides that cases of Enteric Fever from the districts comprised under the Board, instead of coming of necessity into Baguley Sanatorium, may now be removed, at the discretion of the Manchester Corporation, to any of their hospitals, either Baguley or another. By the courtesy of the Joint Hospital Board, this clause in the Agreement was allowed to come temporarily into force from the middle of the summer of 1906, pending the final signing of the whole Agreement. This arrangement relieved us of the necessity of retaining one large block specially for Enteric Fever cases, and—seeing that we usually had only one or two Enteric cases at the same time, and that even one case only necessitated the provision of three separate nurses and a ward maid—a considerable economy was ensured in this way also. It was in consequence of this arrangement that this hospital was able to accommodate at one time more patients than it had ever done before—the numbers rising at one period to 119.

In this connection I would like to draw attention to the fact that the total sum actually expended on the upkeep, repair, etc., of this hospital during 1906 only exceeded that during 1905 by £600, whereas during 1905 patients under treatment numbered 348, and in 1906 numbered 520; that is to say, that 172 more patients were treated at an additional cost of about £600.

The cost per head per week, worked out upon the total amount spent during the year upon upkeep, alterations, repairs, maintenance, etc., and the average number of patients under treatment on each day, was for 1905 about £2 16s., and for 1906 was £2 0s. 6d.—a reduction of 15s. 6d. per head per week.

Fatality Percentage.

The *percentage fatality* on all cases whose treatment was concluded during 1904 was 4·48, during 1905 was 6·64, and during 1906 was 4·10. This last is the lowest general death-rate recorded in the hospital since it was opened in 1902.

The *percentage fatality* of cases of *Scarlet Fever* only has been low during each of these three years, being for 1904, 3·2; for 1905, 3·88; and for 1906, 2·39, and this again is the lowest figure as yet reached.

The *percentage fatality* of cases of *Diphtheria* during 1906 was 8·74, and this comparatively low death-rate I attribute almost entirely to the fact that medical practitioners in the districts from which this hospital is usually supplied with its cases have been remarkably prompt to give injections of the *antitoxin* before sending the cases into hospital.

The following tables give a general review of the cases treated during 1906 :—

LIST A.—*All cases—Present in Hospital on January 1st, 1906, and admitted during 1906.*

DISTRICT	Cases in Hospital on Jan. 1st, 1906	Admitted during 1906	Discharged	Died	Cases in Hospital on Jan. 1st, 1907	Total Cases discharged or who have died	Fatality percentage
Withington	39	117	127	4	25	131	$\frac{4}{131}=3{\cdot}06$
Moss Side.....	6	31	35	0	2	35	...
Levenshulme ...	6	23	24	2	3	26	$\frac{2}{26}=7{\cdot}69$
Bucklow	11	105	81	4	31	85	$\frac{4}{85}=4{\cdot}70$
Other Districts... (Including Cheadle and Bowdon)	2	9	8	0	3	8	...
Private Cases ...	0	5	5	0	0	5	...
Manchester	13	153	141	8	17	149	$\frac{8}{149}=5{\cdot}30$
Totals	77	443	421	18	81	439	$\frac{18}{439}=4{\cdot}1$

Percentage Fatality in 1904—4·48. Percentage Fatality in 1905—6·64.

LIST B.—*All cases admitted during 1906—Divided according to their diagnosis and the districts from which they came.*

DISTRICT	Scarlet Fever	Diphtheria	Enteric Fever	Cases sent in as one disease found on admission to be suffering from another	Cases found on admission to be suffering from two or more diseases—mixed infections	TOTAL
Withington	69	43	0	2	3	117
Moss Side.....	25	3	0	3	0	31
Levenshulme ...	18	3	1	1	0	23
Bucklow	74	22	4	3	2	105
Other Districts...	9	0	0	0	0	9
Private Cases ...	4	1	0	0	0	5
Manchester	146	4	0	2	1	153
Totals	345	76	5	11	6	443

SCARLET FEVER.

Owing to the fact that one large pavilion formerly reserved for Enteric Fever cases was not required for that disease during the greater part of the year, 345 cases of Scarlet Fever were able to be admitted into this hospital in 1906, which, with 61 similar cases remaining in hospital on January 1st, 1906, made a total of 406 cases of Scarlet Fever under treatment, divided as follows :—

LIST C.—*Scarlet Fever only.*

District	Cases in Hospital on Jan. 1st, 1906	Admitted in 1906	Discharged	Died	Cases in Hospital on Jan. 1st, 1907	Total Cases Treated	Death-rate per cent. on all Cases Discharged
Withington ...	29	69	77	0	21	98	—
Moss Side	5	25	29	0	1	30	—
Levenshulme...	5	18	20	0	3	23	—
Bucklow	7	74	53	1	27	81	1·85
Other Districts.	2	9	8	0	3	11	—
Private Cases...	0	4	4	0	0	4	—
Manchester ...	13	146	135	7	17	159	4·93
Totals	61	345	326	8	72	406	2·39

Percentage fatality—1904—3·20.
,, ,, —1905—3·88.
,, ,, —1906—2·39.

Of the eight cases that died, one died within 24 hours of admission to Hospital, and another came in late in the disease suffering from *Nephritis*, and only lived five and a half days. Both cases were practically hopeless from the first. With such comparatively small numbers under treatment the death of two patients makes a great difference in the *percentage fatality* statistics.

The great preponderance in the number of female cases (227) over male cases (118) admitted is accounted for, by the fact that at one period of the year the Monsall Fever Hospital was unable to accommodate all the female cases of Scarlet Fever arising, and a number of these cases had to come to this hospital.

LIST D.—*Incidence of Scarlet Fever according to age and sex.*

District	Age 1 to 5		Age 5 to 10		Age 10 to 20		Age over 20		Totals		
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Withington ...	5	3	19	16	7	10	2	6	33	35	68
Moss Side ...	0	3	7	3	3	8	1	0	11	14	25
Levenshulme..	6	3	2	2	1	3	0	1	9	9	18
Bucklow	8	8	13	17	12	12	2	3	35	40	75
Other Districts	0	1	0	5	1	1	0	1	1	8	9
Private Cases..	0	0	0	1	2	0	1	0	3	1	4
Manchester ...	6	36	12	48	8	32	0	4	26	120	146
Totals	25	54	53	92	34	66	6	15	118	227	345
Totals	79		145		100		21		345		

COMPLICATIONS.

Nephritis.—Eight cases of Scarlet Fever developed Nephritis (*Hæmaturia*) during 1906—a percentage of 2·32. In none of these cases was the throat very dirty on admission, and in a good proportion of them the throat is specifically noted to have been apparently quite clean. The percentage number of cases that developed Hæmaturia in 1904 was 2·21 ; in 1905 was 1·51. This gives a percentage of 2·03 cases of Hæmaturia out of 737 that have passed through the hospital.

I am more than ever of the opinion, expressed in my two previous reports for 1904 and 1905, that Nephritis in Scarlet Fever is caused by the *toxines* absorbed into the system, and that energetic treatment of all cases, with a view to (*a*) cleansing the throat in the first instance, and thereby preventing the formation and absorption of further toxines, and (*b*) making the skin act well from the commencement, and so relieving the kidneys in their work of removing toxines already absorbed, is the best means at our disposal for preventing this serious complication from supervening in cases of Scarlet Fever. I firmly believe, also, that the above treatment if begun from the first, while it will not in all cases stave off the attack of Nephritis, will in all cases very considerably lessen its severity. As some slight proof of this, I may mention that during the three years named—1904, 1905, and 1906—only three fatal cases with Nephritis

have occurred here, one in each year. The one in 1904 did not come under treatment until the 12th day, and I warned the parents at the time of his admission that I feared Nephritis would follow. In spite of all efforts to make the skin act, it remained dry and hard, and on the 19th day of illness Nephritis occurred, and the child died in three days. The cases in 1905 and 1906 both had Nephritis when admitted to hospital, and only lived two days and six days respectively. No case that came under treatment reasonably early during those three years died of Nephritis.

Otorrhœa.—Out of 334 cases of Scarlet Fever that passed through the hospital in 1906, 33 cases had either *single* or *double Otorrhœa.* Of these, five had such discharge when admitted ; 28 developed ear discharge later.

It has been stated that a great number of cases of *Otorrhœa* following Scarlet Fever are incurable, but I think that the number is extremely small. Of the above-mentioned cases, 32 went out absolutely cured, and in only one case did I hear of a recurrence of the discharge. One case went home with discharging ears, the parents preferring to take him home seeing that their two other children had just recovered from Scarlet Fever.

It is worth enquiring whether (*a*) douching of the nose and (*b*) douching of the throat causes ear discharge.

To deal with (*a*) first : Every patient that comes in here with Scarlet Fever has the nose douched once on admission. If no discharge comes away, then the nose is not again douched until either discharge from the nose appears spontaneously, or the patient is to be shown up for inspection with a view to leaving hospital. If there is discharge from the nose, the nose is douched four-hourly if the patient is in the acute stages of the disease, and twice daily if the patient is convalescent. Statistics for the last three years here show that about 20 per cent. of all cases of Scarlet Fever developed nasal discharge, but that 9 per cent. only of all cases developed ear discharge ; and, on further examining the notes of the 28 cases which developed ear discharge, we find that only 11 of these cases had nasal discharge in addition to ear discharge. Of these 11 cases, furthermore, seven developed ear discharge within two days of the commencement of nasal discharge, and, although it is possible, it is very unlikely that the douching of the nose caused these ear discharges. Of the remaining four, two developed double Otorrhœa eight days later, one developed right Otorrhœa four days later, and one developed left Otorrhœa 15 days later than the commencement of nasal discharge and consequent nasal douching. If once douching the nose was to cause Otorrhœa, we should expect more than 28 cases of Otorrhœa out of 334 (a percentage of 8·4), so I propose to ignore that. If continuous douching of the nose was to cause Otorrhœa, we should expect more than 11 cases of Otorrhœa out of about 68 cases that required continuous nasal douching.

(*b*) With regard to the question whether douching of the throat causes ear discharge: The great amount of douching of the throat employed here, combined with the low percentage of ear discharges developing in hospital—*i.e.*, 9 per cent. on all cases treated during the last three years—is, in my opinion, a strong argument against the above suggestion. The rule here is—and the rule is very carefully carried out—that every case has the throat douched with boracic acid lotion and swabbed out with a solution of bicarbonate of soda every four hours for the first 10 days, however apparently clean the throat may be, and thereafter every night and morning until the patient leaves hospital.

The above are, of course, merely negative arguments, but they coincide with my own opinion, that douching neither of the nose nor of the throat will have much influence in causing ear discharges; but rather, I think, that by cleansing the throat, and so getting rid as quickly as possible of the germs which have caused the disease, ear discharge will in many cases be prevented, and in other cases where discharge actually takes place, it will have been rendered more curable by the energetic treatment of the throat. For the cases of ear discharge in this hospital have almost all been entirely cured as far as one can tell before the patients left here; one case only went out with an ear discharging, and that only on account of the very natural impatience of the parents; and of the 32 cured, one only, as far as I could learn, recurred. A few remarks as to their *length of time in hospital* may be of interest:—

Of the 33 cases:—

4 died. Stay in hospital: 3, 4, 14, and 25 days—average, 11·5 days.

1 with Double Otorrhœa stayed in for 198 days: required incision over right mastoid process.

1 ,, ,, ,, 143 ,, :

1 ,, ,, ,, 120 ,, : Pericarditis and Endocarditis helped to lengthen the stay.

1 went home with Left Otorrhœo after 140 days.

25 went home after periods varying between 34 and 95 days.

The average stay in hospital of all cases with Otorrhœa (excluding the deaths) was $76\frac{3}{4}$ days.

The average stay in hospital of all cases of Scarlet Fever was $57\frac{1}{4}$ days.

In three cases, incisions over the Mastoid process, cutting into the Periosteum, were required.

In no case was any further operation required.

RETURN CASES.

Thirteen cases of Scarlet Fever and one case sent in as Diphtheria (but found later not to be so) discharged from this hospital during 1906 may be suspected of having given rise to what are known as "*Return Cases*" of Scarlet Fever. The total number of cases of Scarlet Fever suspected of being caused by the above 14 originating cases is 20. A very careful analysis of these 14 cases shows that *in four cases* nothing could be found either in the notes made during stay in hospital, nor in those made on discharge, nor in the condition of the case noticed at home after discharge, to account for them giving rise to "return cases"; *in two cases* it is possible that the secondary cases were infected at school, several other cases of Scarlet Fever arising in the schools at the same time; *in two cases* the note on discharge stated that the fauces were still slightly red and congested; *in one case* the child suffered from Adenoids, and had a good deal of obstruction and "stuffiness" in the nostrils; *in two cases* the note on discharge described the tonsils as "still very large"; *in one case* it is possible that the child stayed in hospital too short a time—32 days.

It is not, of course, possible to assume very much on the strength of such small statistics as are at my disposal, but I would like to record my strong belief, founded chiefly upon a close personal observation of practically every case treated in this hospital during the last three years, that two of the most important points to be examined in a patient waiting to go home from hospital are the *throat*—to see that all redness has disappeared from the faucial ring—and the *nostrils*—to see that no tiny crack remains in the mucous lining, which is so general in Scarlet Fever.

During the past three years this hospital has been fortunate enough to escape with 21 cases giving rise to "return cases" out of a total of 705 discharged—a percentage of 2·98—and, in the absence of any more definite reasons to the contrary, I cannot help thinking and hoping that the extreme care taken before allowing patients to leave the hospital has had something to do with the—at present—satisfactory result.

The length of stay in hospital of these above-mentioned originating cases in 1906 varied between 32 and 119 days, the average being 59·33. Seeing that the average stay in hospital of all cases of Scarlet Fever was 57·23 days, it may be concluded that as far as this hospital was concerned in 1906 the question of length of stay—whether short or long—did not materially affect the causing of "return cases."

DIPHTHERIA.

During the year 1906, 76 cases of Diphtheria were admitted to this hospital. Of these, 7 died—a percentage of 8·74. Last year the percentage of deaths from Diphtheria here was almost double that for this year. I attribute the present lowering of the percentage very considerably to the fact that last year very many cases were sent in without having previously had *antitoxin* injected; whereas this year the medical practitioners have, with very few exceptions,

invariably administered *antitoxin* before sending the case in, and have thus saved valuable time for the patient.

LIST F.—*Diphtheria.*

District	In Hospital, on January 1st, 1906		Admitted during 1906		Total	Discharged during 1906	Died during 1906	Remaining in Hospital on 1st January, 1907	Total	Percentage Fatality on all cases discharged and who died
	M.	F.	M.	F.						
Withington ...	1	7	17	26	51	44	3	4	51	6·38
Moss Side	0	0	2	1	3	2	0	1	3	—
Levenshulme ...	1	0	1	2	4	3	1	0	4	25·00
Bucklow	1	2	9	13	25	19	3	3	25	13·63
Other Districts	0	0	0	0	0	0	0	0	0	—
Private	0	0	1	0	1	1	0	0	1	—
Manchester	0	0	1	3	4	4	0	0	4	—
Totals	3	9	31	45	88	73	7	8	88	8·74
Totals	12		76		...					

Percentage Fatality, 1904... . ..... 6·06
,, ,, 1905..... 17·02
,, ,, 1906..... 8·74

LIST G.—*Diphtheria Admissions. Age incidence according to districts.*

District	Age 1 to 5		Age 5 to 10		Age 10 to 20		Age over 20		Totals		Total
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Withington	7	8	5	10	5	4	0	4	17	26	43
Moss Side.....	2	0	0	1	0	0	0	0	2	1	3
Levenshulme	1	1	0	0	0	0	0	1	1	2	3
Bucklow	4	2	3	8	1	3	1	0	9	13	22
Other Districts.....	0	0	0	0	0	0	0	0	0	0	0
Private Cases	0	0	0	0	1	0	0	0	1	0	1
Manchester	0	1	0	0	1	1	0	1	1	3	4
Totals	14	12	8	19	8	8	1	6	31	45	76
Totals	26		27		16		7		76		...

ENTERIC FEVER.

Owing to an agreement with the Bucklow Joint Hospital Board, referred to at the beginning of this report, cases of Enteric Fever were not admitted to this hospital after the middle of the year. Five cases were admitted during the earlier part of the year, four from the Bucklow district and one from Levenshulme. The latter case died.

Stay in Hospital of all Cases

The average duration of stay in hospital is comparatively high, but is lower than it was in 1905 or 1904.

The figures for the three years are as follows :—

	Average Stay—in days		
	1904	1905	1906
Cases of Scarlet Fever ..	58·5	59·74	57·23
Cases of Diphtheria	60·2	60·46	44·83
All cases.....	58·75	55·78	53·62

Details of the average stay in hospital of all cases, divided according to their districts and the disease from which each suffered, will be found on opposite page.

Finally, it is interesting to note that the various results obtained here have not varied very perceptibly according to the different class of district from which the patients came. Grouping Manchester and Moss Side together as being districts of a similar type, and grouping all the other districts together, we get the results shown in the following table, with which this report is brought to a close :—

	Manchester, including Moss Side	Remaining Districts, including Withington, Levenshulme, Bowdon, Cheadle, and Private cases	Total
Fatality Percentage—all cases	8 deaths in 184 cases = 4·34%	10 deaths in 255 cases = 3·92%	4·1%
Stay in Hospital—Scarlet Fever cases (Average in days)	57·06	57·40	57·23
Stay in Hospital—all cases ..... (Average in days)	53·83	53·53	53·62
Number of originating cases causing "Return Cases"	7	7	14
Percentage of above originating cases on all cases discharged	4·26%	4·32%	4·29%

LIST H.—*Average stay in hospital in days. All cases discharged or who have died during 1906.*

District	DISCHARGED										Deaths—all Diseases		Total average stay in hospital in days	
	Scarlet Fever		Diphtheria		Enteric Fever		Double Infections		Altered Diagnosis					
	Cases	Average stay Days	Cases	Average stay Days	Cases	Average stay Days	Cases	Average stay Days	Cases	Average stay Days	Number	Average length of life in Hospital	Cases	Average stay
Withington	77	60·27	44	47·02	0	.....	4	120	2	19	4	20	131	55·78
Moss Side	29	65·17	2	35·50	0	.....	0	.....	4	45·25	0	.....	35	61·17
Levenshulme	20	62·15	3	33·66	0	.....	0	.....	1	51	2	4	26	53·96
Bucklow	53	53·17	19	48·42	4	56	1	46	4	50	4	16·50	85	50·28
Other Districts	8	52·25	0	.....	0	.....	0	.....	0	.....	0	.....	8	52·25
Private Cases	4	44·75	1	50·0	0	.....	0	.....	0	.....	0	.....	5	49·80
Manchester.....	135	55·32	4	40·50	0	.....	1	40	1	22	8	9	149	52·11
Totals	326	57·23	73	44·83	4	56	6	94·33	12	41·0	18	12·55	439	53·62

Total average stay in Hospital in days—all cases—1904—58·75
,, ,, ,, ,, 1905—55·78
,, ,, ,, ,, 1906—53·62

T. BASIL RHODES,
Medical Superintendent

REPORT BY MR. A. T. ROOK, SUPERINTENDENT OF THE SANITARY DEPARTMENT.

Sanitary Department,
Town Hall, Manchester.

In presenting to the Medical Officer of Health the report of the work transacted in the Sanitary Department for the year ending 30th April, 1906, I beg to state that the City, for inspection and other purposes, is divided into 29 Districts, to each of which one Sanitary Inspector has been assigned.

In addition to these, there is a Superintendent, one Chief Inspector, two Drainage, five Smoke, one Canal Boats, one Lodging-house, three Adulteration of Food, one Milkshops, six Factory and Workshops Inspectors, including two Female Inspectors, and two Drain Examiners.

There is also a staff of 28 Clerks for clerical and other work.

In the House Drainage Department there is also a Manager, ten Clerks, and eight Clerks of Works for supervising and measuring up work done by the contractors employed by the department in carrying out private drainage work.

The number of complaints of nuisances of various kinds made during the year was 4,734, viz. :—

1,776 through the Medical Officer of Health's Department.
1,526 by the Public.
63 through the Police.
1,369 by the Staff.

HOUSES LET IN LODGINGS.

Under the powers given by Section 90 of the Public Health Act, the bye-laws made thereunder have been enforced.

The number of houses on the register is 1,519.

To these, 5,392 day visits and 321 night visits have been paid.

Ninety-seven infringements of the regulations have been reported and dealt with.

DAIRIES, MILKSHOPS, AND COWSHEDS REGULATIONS.

Under this Order, which was made in July, 1879, and the Regulations thereunder in 1896, 3,025 milkshops and dairies and 65 cowkeepers are now on the register. The number of cows kept is 1,102. The number of visits to dairies, milkshops, and cowsheds was 4,105. Twenty-two infringements of the regulations have been reported and dealt with.

WORKSHOPS, BAKEHOUSES, SHOP HOURS, AND SEATS FOR SHOP ASSISTANTS ACTS.

Shop Hours and Seats for Shop Assistants Acts.

During the year the Acts have been well observed, only a few persons having been reported for infringements.

Workshop Acts.

Much has been done to still further improve the condition of workshops, especially those in which females are employed, and every care has been taken to see that in all cases separate and suitable sanitary accommodation for the sexes has been provided.

Means of escape in case of fire.

With regard to means of escape in case of fire, the whole of the factories and workshops in the City have been inspected, and with very few exceptions are now considered safe.

Periodical changes will, of course, from time to time take place in various ways which will bring buildings within the meaning of the Act, and necessitate the constant supervision of the Inspectors, and action on the part of the authorities.

Bakehouses.

During the year 11 bakehouses in the City have been absolutely closed, and a number of others have been reported by the Medical Officer of Health to be unfit for use until satisfactory alterations are made to place the premises in a better sanitary condition.

Out-workers.

Many visits have been paid to houses in various parts of the City in which out-work is carried on, as will be seen on reference to the following tabulated statement, but constant visitation is necessary to maintain the standard of cleanliness which is to be desired, especially in houses in which shirt-making, handkerchief-hemming, brace-making, and umbrella-covering, etc., is done.

The people, as a rule, appear willing to carry out any suggestion made by the Inspectors to keep their houses clean; but at the same time it is almost impossible for small houses, sometimes containing large families, to be kept in such a satisfactory condition as workshops.

Seats for Shop Assistants Act.

This Act, without the necessity of any legal proceedings, has been complied with by all the shopkeepers of the City.

The work done under the above Acts is shown in the following tables.

Table showing the Work Done by the Inspectors under the Shop Hours, Seats for Shop Assistants, and Factory and Workshop Acts.

Number of District	INSPECTOR	SHOPS — Shop Hours Act					SHOPS — Seats for Shop Assistants Act					WORKSHOPS						OUT-WORKERS		Factories and Workshops not provided with proper means of escape in case of fire	BAKEHOUSES					
		Number of visits	Number of Infringements of Act reported	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register	Number of visits	Number of infringements of Act reported	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register	Number of visits	Number in which Sanitary Defects were found	Number of Reports referred to H.M. Inspector (unregistered factories, &c.)	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register	Number of visits to houses where out-workers are employed	Number of houses found dirty.		Number of visits	Number in which Sanitary defects were found	Number of reports referred to H.M. Inspector of Factories	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register
1	Richard Tolson...	194	...	...	...	686	...	...	...	...	240	2732	256	73	...	194	1217	2	...	1	677	26	...	...	...	82
2	Thos. Partington.	183	...	...	...	1107	...	...	...	...	451	2532	254	45	...	152	1099	4	...	4	653	9	1	...	4	173
3	George Vernon...	232	...	...	...	478	...	...	...	...	175	2025	225	85	1	228	1015	...	...	1	805	41	4	...	...	119
4	Francis J. Rowe..	233	...	1	...	604	...	...	...	...	280	2398	250	96	...	229	1302	7	1	...	477	21	7	...	2	117
...	Emma Coppock..	2629	172	...	176	...	709	...	...	102	...	1864	128	...	13	...	...	768	32	...	...	...	...	...	...	...
...	Margt. L. Brown..	1313	95	1	106	...	391	...	...	28	...	1623	129	3	4	...	...	2510	45	...	...	...	...	...	...	...
...	Totals ...	4784	267	2	282	2875	1100	...	...	130	1146	13174	1242	302	18	803	4633	3291	78	6	2612	97	12	...	6	491

TABLE SHOWING THE NUMBER AND CLASSIFICATION OF PERSONS EMPLOYED AS OUTWORKERS BY FIRMS WITHIN THE CITY, AND THE NUMBER OF SUCH FIRMS.

TRADES	No. of Employers	No of Outworkers or Contractors employed
Tailors	191	964
Shirt Makers	56	1003
Dress, Mantle, Costume, &c., Makers	61	597
Underclothing and Pinafore Makers	32	336
Handkerchief Hemmers	18	475
Boot, Slipper, &c., Makers	44	186
Umbrella Trimmers	21	266
Quilt, Cushion, &c., Makers	4	39
Stay and Corset Makers	2	5
Cabinet Makers, Upholsterers, &c.	12	24
Paper Bag Makers	2	11
Rubber Workers	1	1
Lace Makers	1	4
Optician	1	1
Fur Workers	1	1
Hair Pad and Frame Makers	3	7
Cap Makers	3	6
Belt and Trimming Makers	4	174
Gold Beaters, &c.	1	6
Totals	458	*4106

*3551 of these are in the City, the remainder are in the districts of other Local Authorities to whom they have been sent.

PROSECUTIONS FOR OFFENCES, WITH RESULTS.

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid	Dismissed or Withdrawn
			£ s. d.	£ s. d.	
	SHOP	HOURS ACT.			
James Tong	7, Albert Place, Bridge Street ..	Employing a young person over 74 hours a week	0 5 0	0 8 0	
Harry Hitchin	13, King's Parade, Fallowfield ..	Not exhibiting Abstract of Shop Hours Act in shop	0 5 0	0 9 6	
John Hutchinson	223, Clowes Street, West Gorton	Ditto	0 5 0	0 9 0	
Wm. Pierce & Co.....	26, Cavendish Street, Chorlton-upon-Medlock	Ditto	0 2 6	0 2 6	
	FACTORY AND	WORKSHOP ACT.			
W. B. Shorland	511, Stretford Road, Old Trafford	Neglecting to place workshop, No. 27, Blake Street, Hulme, in a sanitary condition after notice	.....	0 3 6	Withdrawn (work done)
Thomas Worrall	61A, Boston Street, Hulme	Neglecting to limewash his workshop after notice	.....	0 3 6	Ditto
Harris Simon	2, John Street, Ancoats	Neglecting to cleanse closet of workshop after notice	.....	0 3 6	Ditto
S. Kershaw & Sons ..	Deansgate	Neglecting to repair ceiling of bake-house, No. 282, Waterloo Road, after notice	.....	0 3 6	Ditto
		Carried forward	0 17 6	2 3 0	

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid	Dismissed or Withdrawn
			£ s. d.	£ s. d.	
		Brought forward.....	0 17 6	2 3 0	
	FACTORY AND WORKSHOP	ACT—*continued.*			
Browne & Murray ..	4 and 6, Whitworth Street	Neglecting to forward to the Local Authority a list of persons employed by them as outworkers or contractors	.....	0 8 0	Withdrawn
Abraham Barnett ..	171, Rochdale Road	Ditto	.....	.....	Dismissed
John Cowery & Co...	7 and 9, Joiner Street	Ditto	.....	0 6 0	Withdrawn
Sarah Fineberg	88, Bury New Road	Ditto	.....	0 6 0	Ditto
John Jos. Henry....	31, Lever Street	Ditto	.....	0 3 6	Ditto
Jas. F. Murphy	Junction Street, Ducie Street, London Road	Ditto	.....	.....	Ditto
Wm. Macbeth.....	216, Clowes Street, West Gorton.	Ditto	.....	0 3 6	Ditto
Saml. Quinn	428 and 430, Rochdale Road ..	Ditto	.....	.....	Dismissed
D. Riley & Sons....	9, Deansgate	Ditto	.....	.....	Withdrawn
Louis Ray & Co.....	20, Oldham Road	Ditto	.....	.....	Dismissed
John Standring	15, Bradshaw Street	Ditto	.....	0 6 0	Withdrawn
W. & S. Stott.....	7, Sugar Lane, Withy Grove ..	Ditto	.....	0 3 6	Ditto
		Carried forward.....	0 17 6	3 19 6	

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid	Dismissed or Withdrawn
			£ s. d.	£ s. d.	
		Brought forward.....	0 17 6	3 19 6	
	FACTORY AND WORKSHOP	ACT—*continued.*			
Jacob Libstein	Derby Street Cheetham	Neglecting to forward to the Local Authority a list of persons employed by them as outworkers or contractors	.....	0 6 0	Withdrawn
Richard Maginnis ..	35, Granby Row	Ditto	.....	0 6 0	Ditto
Morris Phillips	29, Cheetham Hill Road	Ditto	.....	0 6 0	Ditto
Wolfe Rosenberg ..	15, Bury New Road	Ditto	.....	0 6 0	Ditto
Albert Barnett	117 and 119, Rochdale Road ..	Ditto	.....	0 3 6	Ditto
Albert Irwin	35, Stockport Road	Ditto	.....	0 3 6	Ditto
James Jackson	53, Bloom Street	Ditto	.....	0 3 6	Ditto
Clara Fogg	88, Higher Chatham Street, Chorlton-upon-Medlock	Refusing admission to the Inspector (outworker)	0 2 6	.....	
		Total .....£	1 0 0	5 14 0	

SMOKE NUISANCES.

For the abatement of smoke nuisances, the four Inspectors appointed specially for this work have taken 756 timed observations of half-an-hour each, with the result that 120 notices for the abatement of nuisances have been served. Proceedings before the Magistrates have been ordered in 144 cases out of 188 offences reported. These cases were disposed of as follows:—

One hundred and thirty-nine were summoned before the Justices, in 104 of which fines were imposed amounting to £235 2s. 6d., and costs £59 19s. 6d. Two were ordered to pay costs only.

Twenty-seven orders of abatement were granted and served, 6 cases were excused, dismissed, or withdrawn. (In two cases fines were imposed in addition to orders of abatement being granted.)

Much attention during the past year, as will be seen by the above, has been given to the nuisance caused by the emission of black smoke, not only from the furnaces connected with boilers in mills, warehouses, and other works, but also from chemical and other industries, and the efforts made have already resulted in a considerable reduction of the nuisance.

Table showing the number of Articles of Food and Drugs procured for Analysis, the number Adulterated, the number informally purchased or in which no proceedings were taken, and the number of cases in which Magisterial Proceedings were taken, together with the Decisions and the Total Amount of Fines imposed from May 1st, 1873, to April 30th, 1906.

Article	No. Procured	No. Adulterated	No. informally purchased or in which no proceedings were taken	No. Summoned before Magistrates						
				No. Summoned	No. Fined	No. of Warrants granted	No. ordered to pay Costs only—Dismissed or Withdrawn	Total Amount of Fines imposed		
								£	s.	d.
Arrowroot	6	...	...	...	...	...	...	.....		
Bacon	1	...	...	...	...	...	...	.....		
Baking Powder	61	...	...	...	...	...	...	.....		
Beef Dripping	5	...	...	...	...	...	...	.....		
Beer	558	72	34	38	19	...	19	38	0	0
Bread	1217	39	7	32	32	...	...	119	10	0
Butter	3057	415	34	381	303	3	75	566	13	6
Buttermilk	2	2	2	...	...	...	...	.....		
Camphorated Oil	10	...	...	...	...	...	...	.....		
Castor Oil	1	...	...	...	...	...	...	.....		
Cheese	341	11	4	7	6	...	1	15	5	0
Chicory	43	...	...	...	...	...	...	.....		
Cider	3	...	...	...	...	...	...	.....		
Cocoa	78	...	...	..	...	...	...	.....		
Cod Liver Oil	6	...	...	...	...	...	...	.....		
Coffee	743	40	2	38	37	...	1	57	15	6
Confectionery	371	2	...	2	2	...	...	10	0	0
Cream	17	...	...	...	...	...	...	.....		
Drugs	559	13	12	1	1	...	...	0	5	0
Fish (tinned)	7	...	...	...	...	...	...	.....		
Flour	256	...	...	...	...	...	...	.....		
Fruit (tinned)	2	...	...	...	...	...	...	.....		
Honey	4	...	...	...	...	...	...	.....		
Jams	351	1	...	1	1	...	...	1	0	0
Jelly	2	...	...	...	...	...	...	.....		
Ketchup	1	...	...	...	...	...	...	.....		
Lard	829	27	5	22	18	...	4	44	3	6
Margarine	207	2	...	2	1	...	1	0	5	0
Meats (tinned)	9	...	...	...	...	...	...	.....		
Milk	23918	1666	31	1635	1113	..	522	3187	17	0
Milk (skimmed)	160	27	...	27	22	...	5	45	11	6
Milk (condensed)	9	...	...	...	...	...	...	.....		
Mineral Waters, &c.	320	79	76	3	...	...	3	.....		
Carried forward ...	33154	2396	207	2189	1555	3	631	4086	6	0

ANALYSIS—*continued.*

Article	No. Procured	No. Adulterated	No. informally purchased or in which no proceedings were taken	No. Summoned before Magistrates: No. Summoned	No. Fined	No. of Warrants granted	No. ordered to pay Costs only—Dismissed or Withdrawn	Total Amount of Fines imposed £	s.	d.
Brought forward	33154	2396	207	2189	1555	3	631	4086	6	0
Mustard..	421	47	6	41	35	..	6	19	9	0
Oatmeal.....	244	...	...	...	...	...	...	.....		
Olive Oil	12	1	...	1	1	...	...	0	2	6
Pearl Barley	10	...	...	...	...	...	...	.....		
Pepper	783	7	...	7	6	...	1	12	7	6
Pickles	4	...	...	...	...	...	...	.....		
Porter	8	...	...	...	...	...	...	.....		
Rice, Tapioca, &c.....	153	...	...	...	...	...	...	.....		
Shrimps	8	4	4	...	...	...	...	.....		
Spices	336	1	...	1	...	...	1	.....		
Spirits	1620	69	10	59	54	...	5	127	8	0
Sugar.....	65	...	...	...	...	...	...	.....		
Tea	487	10	7	3	2	...	1	2	0	0
Treacle & Golden Syrup	84	...	...	...	...	...	...	.....		
Tripe	1	...	...	...	...	...	...	.....		
Vegetables (tinned) ...	18	9	8	1	...	...	1	.....		
Vinegar.....	132	8	...	8	7	...	1	2	10	6
Wines	48	...	...	...	...	...	...	.....		
Totals.....	37588	2552	242	2310	1660	3	647	4250	3	6

Other Offences against the Acts.

Offence	No. Summoned	No. Fined	No. Dismissed or Withdrawn	Total amount of Fines imposed £	s.	d.
Refusing to serve Inspeetor with Samples of Food	23	22	1	73	2	6
Giving False Warranty	24	6	18	46	0	0
Obstructing Inspector in the execution of his duty..	4	2	2	10	0	0
Selling Milk from a vehicle which had not the name and address of the person inscribed thereon	6	5	1	1	0	6
Selling Skimmed Milk from a can unlabelled	2	...	2	.....		
Selling Margarine in an unstamped wrapper.....	6	3	3	0	6	0
Ditto Margarine Cheese	1	1	...	0	5	0
Totals.....	66	39	27	£130	14	0

Total amount of Penalties for Adulteration.....	£4,250	3	6
Total amount of Penalties for Other Offences.....	130	14	0
Grand Total.....	£4,380	17	6
Total amount of Penalties against Farmers	£2,017	13	6

CANAL BOATS ACTS.

The number of canal boats on the register is 507.

The number of inspections made was 1,877, resulting in seven infringements of the Act being discovered, which were referred to the Justices to be dealt with. In five of the cases fines were imposed amounting to £1 17s. 6d., with costs £2 2s. Two cases were excused.

Caution notices were sent to the owners and masters.

OFFENSIVE TRADES.

The number of offensive trades on the register is 739. These have been placed under close supervision, and periodical visits paid.

UNHEALTHY DWELLINGS.

During the year, 352 houses were certified to be dealt with by the Sanitary Committee.

Of these, 286 were ordered to be closed.

In the majority of these the owners arranged to make alterations to meet the requirements of the Corporation.

PARTICULARS RELATING TO THE OPERATIONS OF THE CLEANSING DEPARTMENT.

Cleansing Department,
Town Hall, Manchester,
June, 1907.

Dear Sir,—There are within the City:* pail-closets, 62,927; ash-boxes, 83,995; ash-bins,2, 380; midden-privies, 16,996; wet middens, 9,149; dry middens, 1,195; water-closets, 74,496; and cesspools, 53. The pail-closets are systematically emptied at regular intervals—once, twice, or thrice weekly, as necessity demands. The midden-privies are emptied as required. The contents of the pail-closets are taken to Holt Town and Water Street. At Holt Town the fæcal matter is dried into concentrated manure. The dry refuse is consumed in the Galloway boilers, and generates the steam required for working the machinery. The worthless fine ash, which cannot be consumed, is deposited at the nearest tip at Clayton Vale. The privy refuse and fæcal matter, which is taken to Water Street, is sent away in its crude state as nightsoil to Carrington and Chat Moss Estates and to farmers in Cheshire. Dry combustible matter is passed into the destructor furnaces or under the Galloway boilers at Water Street, and there destroyed. A large quantity of fine ash at Water Street is used as an absorbent for the fæcal matter from the pail-closets.

The market garbage, of which we have 5,396 tons per annum, is carted to Water Street, and destroyed in the furnaces. Slaughter-house refuse is collected from the abattoirs and private slaughter-houses and sent to Holt Town, where

---

* Inclusive of the District of Moss Side.

it is passed through dryers, and the dry material is then added to the concentrated manure. Street sweepings are generally deposited at the nearest depot, and after being allowed to drain are carted to the nearest tip, or to the Water Street Depot, from whence they are sent away by boat to farmers or the Committee's Estates. The total quantity of material collected by this Department during the past year amounted to 380,179 tons.

We have within the City about 41 destructor furnaces of various kinds, and last year 8,894 tons of mortar was made from the clinker obtained from such furnaces.

We employ about 51 "orderly" youths and men, who collect horse-droppings and litter from the streets, and deposit the same in the bins fixed in the footpaths. The contents of the bins are removed twice daily, and taken to the nearest depot.

Acting upon instructions received from you, special pails and lids are supplied for all cases of Enteric Fever; labels are attached to the pails asking the occupants of the house to use disinfectants, which are supplied with the pails; the pails are left in the yard, and not placed in the ashplace. The occupants are requested to use this special pail for the reception of the fæcal matter and washings from the patient only. The pails are removed in a specially-constructed vehicle, and taken to Holt Town Depot, where the contents are destroyed.

With regard to the cleansing of passages, we have a staff of about 52 men engaged specially upon this work. They regularly, at least once a week, cleanse the back passages in certain districts, and during last year 337,959 swillings and cleanings were effected in courts and passages.

During the year, 101,320 barrels of water were used in degging the streets, and 320,593 grids were unstopped.

During the past 16 years, we have deposited upon the various tips within the City the following quantities of material, viz.:—In 1892, 99,866 tons; 1893, 109,078 tons; 1894, 103,949 tons; 1895, 113,836 tons; 1896, 107,883 tons; 1897, 99,658 tons; 1898, 96,635 tons; 1899, 104,481 tons; 1900, 95,138 tons; 1901, 64,781 tons; 1902, 117,619 tons; 1903, 180,985 tons; 1904, 141,999 tons; 1905, 118,093 tons; 1906, 109,446 tons; and in 1907, 134,072 tons. The bulk of this material was deposited on the tips at Clayton and Harpurhey. It is composed principally of dry ashes, street sweepings, and bell-dust. Occasionally the contents of dry middens are sent there. During last year 14,709 tons of material was sent to Carrington Estate and 56,286 to Chat Moss Estate.

Yours faithfully,

R. WILLIAMSON,

Superintendent.

Dr. Niven,
Medical Officer of Health,
Town Hall, Manchester.

DEPARTMENT OF MEAT INSPECTION.

City Abattoirs,
Manchester.

To the Chairman and Gentlemen,
Markets Committee.

The Veterinary Inspector has pleasure in submitting the following report of the amount of unwholesome food condemned under the Public Health Act, 1875, during the year ending December 31st, 1906 :—

Abattoir and Carcase Market.

The number of animals slaughtered in the Abattoir, Water Street, during the 12 months :—

Cattle	Sheep	Lambs	Calves	Pigs
30,650	121,305	50,242	1,848	10,689

The number of carcases exposed for sale in the Dead Meat Market, Water Street :—

	Beasts	Sheep	Lambs	Calves	Pigs
Abattoir killed ..	28,316	114,729	48,245	526	1,211
Imported Fresh ..	39,102	15,203	136	19,114	15,524
Imported Chilled & Frozen	22,245	191,687	65,457	911	22,406
Total	89,663	321,619	113,838	20,551	39,141

Beasts, Sheep, and Pigs Offals :—

Imported and exposed in the Meat Market { Fresh .. .. .. 1,005,800lbs. / Chilled and Frozen 2,048,400 ,,

Rusholme Abattoir.

The number of animals slaughtered at the Abattoir, Monmouth Street, Rusholme :—

Beasts	Sheep and Lambs	Calves	Pigs
746	6,432	219	2,963

Moss Side Abattoir.

The number of animals slaughtered at the Abattoir, Denmark Road, Moss Side :—

Beasts	Sheep	Lambs	Calves	Pigs
247	1,019	401	6	3,486

Private Slaughter-houses.

The amount of slaughtering executed in the private slaughter-houses is approximately estimated in the following figures :—

	Cattle	Sheep and Lambs	Pigs
Beef Butchers	8,864	40,320	—
Pork ,, ...	—	—	16,540

Unsound Food.

The amount of unwholesome food condemned during the year is summarised in the following tables :—

Meat and Fish.

Beef	221,255 lbs.
Mutton	28,922 ,,
Veal	5,540 ,,
Venison	438 ,,
Pork	36,031 ,,
(Imported Offals)	21,927 ,,
Total	314,113 lbs.
Fish	280,954 lbs.
Shellfish	68,279 ,,
Total	349,233 lbs.

Game and Rabbits.

Ptarmigan	88 brace
Partridges	78 ,,
Grouse	69½ ,,
Black Game	69 ,,
,, ,,	4 hampers
Hazel Hens	31½ brace
Pheasants	10½ ,,
Capercailzies	1 head
Plover	1 ,,
Snipe	1 ,,
Hares	81 ,,
Rabbits	8,682 head

Poultry.

Pigeons	120 head
Chickens	95 ,,
Turkeys	27 ,,
Ducks	16 ,,
Geese	2 ,,

Fruit.

Plums	128 sieves
Pears	33 boxes
,,	1 barrel
Greengages	25 sieves
Grapes	15 barrels
Blackberries	12 baskets
Black Currants	7 ,,
Raspberries	1 tub
Oranges	4 cases
Tomatoes	1,595½ boxes & 24 crates

Vegetables.

Cress	246 baskets
,,	9 boxes
Brussel Sprouts	172 baskets
Kidney Beans	94 ,,
Parsnips	60 bags
Mushrooms	26 baskets
Cauliflowers	14 crates
Onions	4½ bags

Miscellaneous.

Eggs	1586
,,	6 cases
Cheeses	1½ (45lbs.)
Butter	part case
Yeast	71 bags
Salmon	1083 tins
Herrings & Tomatoes	23 ,,
Condensed Milk	248 ,,

Number of Seizures and reasons therefor.

The number of carcases, portions of carcases, and consignments of fish, etc., condemned during the year have been 2,950, and from the following causes :—

Decomposing	1,870	Hydatids	4
Tuberculosis	406	Mammitis	4
Unmarketable	176	Nephritis	1
Emaciation	105	Sarcoma	3
Dropsy	59	Swine Fever	3
Smothered	57	Unseasonable	2
Inflammation	46	Parasites	2
Fluke	37	Actinomycosis	2
Injured	25	Fatty Degeneration	2
Fever	23	Cirrhosis	2
Bone Taint	21	Enteritis	1
Abscesses	15	Heart Disease	1
Black Quarter	14	Rheumatism	1
Pericarditis	9	Pyæmia	1
Choked	9	Milk Fever	1
Pneumonia	8	Blood Poison	1
Unclean	8	Anthrax	1
Peritonitis	7	Bronchitis	1
Congestion	7	Necrosis	1
Pleurisy	6	Tumours	1
Joint Disease	6	Septicæmia	1

The following table will show where the meat and fish were condemned, and amount taken from each place :—

In the Abattoir and Carcase Market	271,409	lbs.
of which 186,157 lbs. was dressed meat consigned from other places than the City, 21,927 lbs. being imported offals.		
,, Pig Market	10,232	,,
,, Cold Air Stores	16,679	,,
,, Shops	5,843	,,
,, Private Slaughter-houses	2,101	,,
,, Rusholme Abattoir	358	,,
,, Farm	540	,,
,, Crumpsall Workhouse	539	,,
At the Triperies	258	,,
,, Railway Stations	22,134	,,
,, Fish Markets	333,253	,,
	663,346	lbs.

The game, rabbits, poultry, fruit, vegetables, and miscellaneous :—

At Fish Markets.

Ptarmigan	88 brace
Grouse	69½ ,,
Black Game	69 ,,
,, ,,	4 hampers
Hazel Hens	31½ brace
Partridges	70½ ,,
Pheasants	8½ ,,
Capercalzies	1 head
Snipe	1 ,,
Plover	1 ,,
Pigeons	120 ,,
Chickens	95 ,,
Turkeys	25 ,,
Ducks	16 ,,
Hares	33 ,,
Rabbits	7,473 ,,

At Smithfield Market.

Rabbits	1,117 head
Tomatoes	1,595½ boxes
,,	24 crates
Brussel Sprouts	144 baskets
Cress	246 ,,
,,	9 boxes
Parsnips	60 bags
Kidney Beans	94 baskets
Cauliflowers	14 crates
Mushrooms	26 baskets
Onions	4½ bags
Plums	128 sieves
Pears	33 boxes
,,	1 barrel

Smithfield Market—continued.

Greengages	25 sieves
Grapes	15 barrels
Blackberries	12 baskets
Black Currants	7 ,,
Oranges	4 cases
Raspberries	1 tub

At Railway Stations.

Yeast	71 bags
Brussels Sprouts	28 baskets
Eggs	6 cases
Geese	2 head
Turkeys	2 ,,
Butter	part case

Shops.

Rabbits	12 head
Eggs	816
Cheeses	1½ (45 lbs.)
Salmon	1083 tins
Herrings & Tomatoes	23 ,,
Condensed Milk	248 ,,

Cold Air Stores.

Partridge	7½ brace
Pheasants	2 ,,
Hares	48 head
Rabbits	80 ,,

Warehouse.

Eggs	770

Particulars of Inspection.

With the exception of 1,034 tins of salmon and 546 eggs the whole of the above amounts have been surrendered* by the trade after being condemned by the Inspectors.

* The term surrender includes cases in which the Inspector has discovered the diseased meat in the course of his duty.

In addition to the supervision of the abattoirs and other markets, there have been 1,864 visits made to private slaughter-houses (56 being at the request of the butchers), and 10,706 carcases examined in them. Of these, 60 carcases and portions of 11 others were condemned as unfit for human food (comprising 54 pig carcases and 4 portions, 4 sheep carcases, 2 beast carcases, and 7 portions).

There have been 7,797 visits made to the meat, fish, fruit, and provision shops in the poorer districts of the City. Of these, 250 were made on Sunday morning. Sixty-eight shopkeepers have been cautioned for having small amounts of unsound food in their possessions.

The triperies, bacon, sausage, and pie factories have been regularly inspected, but nothing of an objectionable nature was discovered.

Fifty-four visits have been made to the railway stations, with a view to ascertain what consignments of meat and fish are consigned direct to shops and coming to our markets for inspection.

Two orders for the destruction of unwholesome food have been obtained at the City Police Courts.

Legal proceedings under the Public Health Act, 1875, have been taken against one shopkeeper for exposing for sale unsound eggs, and a fine of £2 and costs was imposed.

Sixteen hundred and fourteen official certificates have been granted (upon request) to the meat and fish salesmen of the markets for the purpose of being forwarded to their senders as a guarantee of what has been condemned.

A. D. Minor.

CONTAGIOUS DISEASES OF ANIMALS.

Glanders.

During the year there have been ten outbreaks of glanders within the City. Ten horses were found affected with the disease, and eight of them were slaughtered by order of the Local Authority.

Their total value amounted to £232, and the owners were compensated in accordance.

Two of the horses were not reported until after death.

Anthrax.

Two cases of anthrax have occurred in the City: one being at a farm, and the other being a dressed carcase sent to the Abattoir from Cheshire.

Swine Fever.

There have been no outbreaks of swine fever within the City during the past 12 months.

Parasitic Mange.

Seven outbreaks of parasitic mange in horses have been dealt with under the (Parasitic Mange) Order, 1906.

The horse-owners have carried out the instructions of the Inspectors, and have been successful in getting rid of the disease.

Pig Market.

The Pig Market, Water Street, is visited daily by an Inspector of the Local Authority under the Swine Fever Order, 1894, and various Orders of the Board of Agriculture are carefully enforced.

Railway Stations.

Three hundred and forty visits have been made to the Railway Sidings and Cattle Docks for the purposes of the Animals (Transit and General) Order of 1895.

Horse Market.

At each monthly Horse Market a Veterinary Inspector is in attendance, as required by the Glanders and Farcy Order, 1894.

A. D. Minor.

REPORT ON THE HEALTH OF THE WITHINGTON DISTRICT IN 1906.

By Dr. Railton, District Medical Officer of Health.

The total number of deaths among persons belonging to the Withington District during the year 1906 amounted to 448—235 males and 213 females.

It is made up of the following figures:—

Deaths of residents within the district	383
,, ,, ,, in the Chorlton Union Workhouse	37
,, ,, ,, in localities outside the district ..	28
	448

The population of the district in June, 1906, being taken as 39,000, the death-rate is calculated to be 11·4. The corresponding rate for 1905 was 10·05.

The births during the year were 761, and the birth-rate was 19·5, compared with 20·8 in 1905. There were 372 males and 389 females.

The death-rates and birth-rates of the different townships for 1906 are respectively as follows:—

	Death-rate.	Birth-rate.
Withington (including Whalley Range)	11·4	16·8
Didsbury	11·0	15·3
Chorlton-cum-Hardy	11·7	25·5
Burnage	11·7	26·9

Table of the ages at which the deaths occurred from 1896 *to* 1906.

Ages	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
Under 1 year of age	67	63	82	66	75	82	72	77	79	64	86
Between 1 year and 5 years	31	27	37	29	31	32	38	25	28	25	39
Between 5 and 15 years	7	14	16	8	28	13	15	8	11	7	8
Between 15 and 25 years	16	14	18	11	15	13	17	12	12	14	16
Between 25 and 65 years	119	126	132	158	157	153	144	171	178	147	165
Over 65 years of age	75	91	102	91	102	120	126	117	131	125	134

The 86 deaths under one year are equivalent to an annual infantile death-rate of 113 per thousand births, compared with 85 per thousand in 1905.

Infantile Mortality.

Causes of death under one year in 1906 *and* 1905.

Name of Disease		1906	Corresponding figures for 1905
1. Pulmonary diseases	Bronchitis	13	9
2. Infectious diseases	Influenza	—	1
	Measles	1	1
	Whooping Cough	2	2
	Tuberculosis	3	2
3. Diet diseases	Diarrhœa	15	6
	Enteritis	4	1
	Wasting and Gastro-intestinal Catarrh	11	7
	Convulsions	10	9
4. Congenital diseases	Premature Birth	13	8
	Debility	—	9
	Congenital defects	4	4
	Heart Disease	1	—
5. Other causes	Suffocation in bed	1	—
	Injuries	1	2
	Not classified	7	3
		86	64

Infantile Mortality.

Deaths under one year per thousand births. Different townships compared from 1896 *to* 1906.

Township	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
Withington	120	92	142	157	94	175	103	139	110	89	96
Didsbury	96	81	118	50	128	89	80	92	93	66	144
Chorlton-cum-Hardy	90	84	152	90	121	78	105	80	105	67	104
Burnage	148	165	132	102	114	255	95	89	104	164	145

Deaths throughout the district in children under five years of age from 1896 *to* 1906.

Name of Disease	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
Measles	1	11	2	1	6	1	15	6	1	6	4
Scarlet Fever	...	...	2	...	4	1	2	3	1	...	...
Whooping Cough	9	4	5	5	3	5	1	12	9	2	2
Diphtheria and Membranous Croup	3	...	4	2	3	3	3	1	1	3	3
Enteric Fever	...	...	...	...	...	...	...	...	...	...	...
Epidemic Influenza	...	2	3	1	1	1	2	...	2	3	...
Diarrhœa	6	8	12	19	7	22	3	7	7	7	17
Enteritis	...	...	...	...	...	3	...	3	4	2	4
Erysipelas	...	...	...	...	...	1	...	1	...	...	...
Tuberculosis	...	...	...	...	...	14	8	10	9	5	10
Bronchitis, Pneumonia, Pleurisy, etc.	23	14	19	9	13	11	22	9	21	13	21
All other causes	56	51	72	58	69	52	54	50	52	48	64
Total...	98	90	119	95	106	114	110	102	107	89	125

Deaths of all persons belonging to the district in 1906 *and previous five years.*

Name of Disease	1901	1902	1903	1904	1905	1906
Smallpox	...	...	.	...	...	...
Measles	1	17	6	1	7	4
Scarlet Fever	1	7	3	3	1	...
Whooping Cough	5	1	12	9	2	2
Diphtheria and Memb. Croup	6	6	2	3	4	6
Croup	...	...	1	1	...	...
Fever — Typhus	...	...	...	...	...	...
Fever — Enteric	1	1	1	2	2	...
Fever — Other continued	...	...	..	...	...	...
Epidemic Influenza	10	11	5	7	11	9
Cholera	...	...	...	...	...	...
Plague	...	..	...	...	1	...
Diarrhœa	24	3	7	7	8	17
Enteritis	4	1	3	4	2	4
Puerperal Fever	1	...	...	...	1	...
Erysipelas	3	1	2	1	2	1
Other Septic Diseases	3	7	2	2	2	2
Phthisis	26	27	38	29	20	35
Other Tubercular Diseases	17	11	14	11	9	15
Cancer, Malignant Disease	37	32	35	31	32	28
Bronchitis	24	30	22	50	35	39
Pneumonia	42	35	21	33	26	31
Pleurisy	...	2	3	1	2	...
Other Diseases of Respiratory Organs	1	6	4	1	3	...
Alcoholism, Cirrhosis of Liver	4	8	10	11	5	6
Venereal Disease	...	1	3	...	...	...
Premature Birth	2	5	13	13	9	13
Diseases and accidents of Parturition	2	...	5	2	...	...
Heart Diseases	53	36	36	45	46	42
Accidents	6	6	5	7	2	12
Suicides	3	7	5	6	3	8
Injuries	1	...	1	2	...	...
All other causes	136	151	151	157	147	174
Total	413	412	410	439	382	448

Death-rates per thousand of the population from the principal diseases given in the previous table, 1901 *to* 1906.

Name of Disease	1901	1902	1903	1904	1905	1906
Measles	0·02	0·48	0·16	0·02	0·18	0·10
Scarlet Fever	0·02	0·20	0·08	0·08	0·02	...
Whooping Cough	0·14	0·02	0·33	0·24	0·05	0·05
Diphtheria and Membranous Croup	0·17	0·17	0·05	0·08	0·10	0·15
Enteric Fever	0·02	0·02	0·02	0·05	0·05	...
Epidemic Influenza	0·29	0·30	0·13	0·18	0·28	0·20
Diarrhœa	0·70	0·08	0·19	0·18	0·21	0·43
Phthisis	0·76	0·77	1·05	0·78	0·52	0·89
Other Tubercular Diseases ...	0·50	0·31	0·38	0·29	0·23	0·38
Cancer, Malignant Diseases ...	1·08	0·91	0·97	0·83	0·84	0·71
Diseases of the Respiratory Organs	1·97	2·08	1·38	2·29	1·73	1·79
Alcoholism, Cirrhosis of Liver...	0·11	0·22	0·27	0·29	0·13	0·15
Heart Diseases...	1·55	1·02	1·00	1·21	1·21	1·07

The zymotic death-rate (Measles, Scarlet Fever, Whooping Cough, Diphtheria, Membranous Croup, Enteric Fever, Puerperal Fever, Plague, Erysipelas, and Diarrhœa) amounts to 0·76, compared with 0·73 in 1905.

Zymotic death-rates of the different townships in 1905 *and* 1906.

	1905		1906
Withington, including Whalley Range..	0·66	....	0·65
Didsbury	0·29	....	0·77
Chorlton-cum-Hardy	1·10	....	0·97
Burnage	1·49	....	0·49

A summary of the action taken during the year for preventing the spread of disease.

Smallpox.—No case occurred.

Measles.—The following table shows the distribution of the disease throughout the district as regards month and place :—

Month	Withington	Didsbury	Chorlton-cum-Hardy	Burnage	Total
January	—	—	—	—	—
February	—	—	1	—	1
March	—	—	—	—	—
April	3	41	—	—	44
May	4	13	—	—	17
June	24	2	—	1	27
July	4	1	1	—	6
August	—	1	2	—	3
September	—	—	6	—	6
October	—	—	7	1	8
November	3	—	9	—	12
December	—	1	36	—	37
	38	59	62	2	161

Didsbury in April, Withington in June, and Chorlton-cum-Hardy in December have been visited rather severely by this disease. No school was closed by the Sanitary Authority on account of measles, but the schools concerned have been warned of the occurrence of any case, and no other members of the family have been allowed to attend. Printed precautions have been left at the houses in which the disease has occurred, and also at other houses in the immediate neighbourhood.

The 4 deaths from measles, all of which were in children under 5 years of age, give a case mortality of 2·4 per cent., compared with 3·2 in 1905.

Scarlet Fever.—The following table shows the number and distribution of cases of scarlet fever, and the number of patients removed to hospital, during the year 1906:—

Month	Withington	Didsbury	Chorlton-cum-Hardy	Burnage	Total	Number removed to Hospital
January	4	1	12	—	17	10
February	5	1	7	—	13	5
March	2	—	3	—	5	5
April	1	—	1	—	2	1
May	3	1	2	1	7	4
June	1	2	4	—	7	2
July	—	—	4	—	4	4
August	—	—	1	—	1	1
September	—	9	3	—	12	11
October	2	2	7	—	11	10
November	6	2	8	—	16	14
December	6	3	7	2	18	13
	30	21	59	3	113	80

Chorlton-cum-Hardy, as in the previous year, has suffered considerably from the prevalence of scarlet fever and diphtheria.

The attack-rate for the whole district was 2·9 per thousand, compared with 3·5 in 1905, and 2·1 in 1904.

The case mortality for 1906 was nil, compared with 0·7 per cent. in 1905, and 3·7 per cent in 1904.

Diphtheria and Membranous Croup.—A large number of cases of diphtheria have occurred in the district during the year, as shown in the following table.

Chorlton-cum-Hardy has suffered more than any of the other townships during the past year, but throughout the whole district the disease has been

steadily becoming more prevalent during recent years. Thus, for the ten years 1894 to 1903, the annual average was 21, while for the three years 1904, 1905, and 1906 the average was 46, or more than double the number.

Month	Withington	Didsbury	Chorlton-cum-Hardy	Burnage	Totals	Number removed to Hospital
January	—	—	5	—	5	5
February	2	1	3	—	6	6
March	—	—	2	—	2	1
April	—	1	6	—	7	6
May	—	1	5	—	6	3
June	—	—	1	—	1	1
July	—	1	—	—	1	1
August	—	1	6	—	7	6
September	1	—	8	—	9	8
October	1	—	11	—	12	6
November	3	—	2	—	5	4
December	2	—	1	—	3	—
	9	5	50	—	64	47

During the year 89 swabs were examined, and in 28 instances diphtheria bacilli were found to exist, but of these 5 were cases which had been previously examined. Of the actual 64 cases of the disease notified, 30 were tested, while in the remaining 34 cases there were no tests.

The attack rate for the whole district was 1·6 per thousand, compared with 1·3 in 1905, and 0·7 in 1904.

The case mortality for the year was 9 per cent., compared with 8 per cent. in 1905, and 10·7 per cent in 1904.

Seventy-two phials of diphtheria antitoxin were supplied to the medical profession for use in the district during the year.

Whooping Cough.—Two deaths were registered, both of them in infants under one year. The disease prevailed in Chorlton-cum-Hardy considerably during the months of April, May, and June.

Enteric Fever.—Twelve cases of Enteric Fever were reported during the year, none of which proved fatal.

Month	Withington	Didsbury	Chorlton-cum-Hardy	Burnage	Totals	Number removed to Hospital
January	—	—	—	—	—	—
February	—	—	—	—	—	—
March	—	—	—	—	—	—
April	—	—	—	—	—	—
May	1	1	—	—	2	—
June	—	—	—	—	—	—
July	—	2	—	—	2	—
August	—	1	—	—	1	1
September	1	1	—	—	2	1
October	1	2	—	—	3	3
November	—	1	—	—	1	1
December	—	—	1	—	1	—
	3	8	1	—	12	6

In seven of the above cases the typhoid reaction was obtained, in the others no test was made.

In 12 other instances the test was made, but with a negative result. The attack-rate for the whole district was 0·3, compared with 0·15 per thousand in 1905.

The case-mortality was nil, compared with 33·3 per cent. in 1905.

The six cases removed were sent to Monsall Hospital.

On the notification of a case of enteric fever, a special pail for the evacuations is at once provided and changed once or twice weekly, and at the end of a case, both water-closet and ashpit are thoroughly disinfected with a solution of corrosive sublimate.

Erysipelas.—Seven cases of erysipelas were notified during the year, one of which died. In each case enquiries were made as to whether a monthly or district nurse was in attendance. One case was removed to Monsall Hospital

Puerperal Fever.—Two cases of the disease occurred. One of the patients was removed to Monsall Hospital. The bed was stoved in each instance, and the dresses and instruments of the nurses who had been in attendance were disinfected.

Phthisis.—Thirty-five deaths from phthisis were recorded in 1906. In two instances the sputum was examined. Disinfection was carried out completely after 30 of these cases, and partially in 4 others. Forty-eight specimens of sputum were examined during the year, with the result that in 11 tubercle bacilli were found to be present, and in 37 no tubercle bacilli were found.

In addition to disinfection after fatal cases, it was carried out during life in 7 instances after removals, etc.

The following table shows the number of cases in which rooms and bedding have been disinfected after phthisis for each year since the practice was commenced (March 8th, 1900) :—

	1900	1901	1902	1903	1904	1905	1906
Fatal cases of Phthisis	38	26	27	38	29	20	35
Rooms of patients disinfected, paper stripped, walls washed down with 2 per cent. chloride of lime solution, and bedding stoved ..	11	20	20	30	24	24	37
Partial disinfection	3	1	4	1	2	3	4
Disinfection refused	24	5	3	7	7	..	1

The figures with regard to disinfection relate to all patients suffering from Phthisis reported either as having died or as having removed to other premises.

Twenty-seven Voluntary Notifications of phthisis were received.

Removed to Hospital.—The number of patients removed to hospital is as follows :—

Disease	Baguley Sanatorium	Monsall Hospital	Chorlton Union Workhouse
Diphtheria	47	—	—
Erysipelas	—	1	—
Scarlet Fever	79	1	—
Enteric Fever	—	6	—
Puerperal Fever	—	1	—
	126	9	—

The number of patients who have suffered from scarlet fever, diphtheria, and enteric fever in the district in each of the years from 1895 to 1906, together with the annual number of removals to hospital, is shown in the following table :—

Year	Number of Cases of Fever in the District	Removed to Hospital	Percentage of Removals
1895	S.F. 102. D. 22. E. 20—Total 144	49	34
1896	S.F. 120. D. 13. E. 10— ,, 143	63	44
1897	S.F. 177. D. 16. E. 10— ,, 203	121	59
1898	S.F. 70. D. 22. E. 25— ,, 117	54	46
1899	S.F. 68. D. 16. E. 16— ,, 100	28	28
1900	S.F. 204. D. 14. E. 8— ,, 226	120	53
1901	S.F. 245. D. 31. E. 11— ,, 287	162	56
1902	S.F. 109. D. 26. E. 6— ,, 141	73	51
1903	S.F. 85. D. 31. E. 14— ,, 130	58	44
1904	S.F. 80. D. 28. E. 5— ,, 113	43	38
1905	S.F. 136. D. 50. E. 6— ,, 192	92	47
1906	S.F. 113. D. 64. E. 12— ,, 189	133	70

Disinfection.—The total number of articles stoved in 1906 was 5,641, and consisted of the following :—Beds, 280 ; mattresses, 319 ; pillows, 731 ; blankets, 606 ; counterpanes, 272 ; carpets, 499 ; various articles of clothing, 1,985 ; and sundries, 949.

Water Supply of the Withington District.

The greater part of the district is supplied with Manchester water coming from the Audenshaw reservoir, but there are many outlying farms and other premises which are still dependent upon shallow wells. All the milk farms, however, are supplied with Manchester water with the exception of two. The water of the pumps in these cases has been analysed during the past year and found to be unsatisfactory. In both instances steps are being taken to provide a supply of wholesome water.

Building in the district during 1906.—The total number of houses certified as fit for habitation during the year ending December 31st, 1906, was 560, distributed as follows:—Withington (including Whalley Range) 295; Didsbury 67; Chorlton-cum-Hardy 167; and Burnage 31. In all these the drains and other sanitary arrangements have been tested by the Inspector of New Buildings.

Notices served during the year for the alteration of insanitary conditions.

	Notices	Houses concerned
Under Section 46 M.I. Act, 1845	3	3
Under Section 41 M.N.S. Act, 1853 ..	—	—
Under Section 41 P.H. Act	28	66
Under Sections 91 to 94 P.H. Act	53	182
Town Clerk Notices	90	120
	174	371

Insanitary premises altered without notices—78.

Premises inspected as to their sanitary condition after the notification of cases of infectious fever, including phthisis—205.

Premises disinfected after fevers, including phthisis—214 houses (417 rooms).

Premises smoke-tested—4

Water-closets of approved pattern substituted for privies—176.

Privies abolished without w.c.'s being substituted—11.

Dairies and Cowsheds.—The cowsheds have been regularly inspected during the year, and with a few exceptions, have been kept in a satisfactory condition.

In certain cases it has been found necessary to warn the cowkeepers to keep their premises in a cleaner condition, and since then they have been maintained in a better state.

Report on the Administration of the Factory and Workshop Act, 1901, in so far as this Administration is in the hands of the Withington Committee, and is concerned with matters in the Department of the District Medical Officer of Health.

1.—*Workshops.*

The number of workshops now on the register is 594.

The cubic capacity of each workshop has been measured, and cards have been placed in each room showing the maximum number of workpeople allowed.

Attention has been given to the cleanliness and ventilation of the workshops.

In 87 cases the walls and ceilings of the workshops were found to be in a dirty condition, and verbal instructions were given by the Inspector to have the premises cleansed.

This request has, in each instance, been sufficient to cause the premises to be cleansed without legal notice.

In 6 workshops the sanitary accommodation was found to be unsatisfactory, and was reported by the Inspector to the Medical Officer of Health. In 4 instances there was no accommodation for the workmen. In 3 instances satisfactory closet accommodation has been provided upon a verbal request being made. In the fourth case the owner of the premises has been served with a notice to provide sanitary accommodation.

In the two remaining cases, certain defects existing in the closets were made good after verbal instructions being given, and legal notices have not been necessary.

In one instance overcrowding of the workshop was found, but the nuisance has been abated at once upon verbal instructions being given.

2.—*Bakehouses.*

There are now on the register 47 bakehouses, which, on the whole, are kept in a clean and satisfactory condition. In 20 instances during the year it has been found necessary to call the attention of the occupiers to the state of the walls, etc., and to request them to have them cleansed. In all cases this has been done without legal notice.

All the bakehouses comply with the Act in not having any sanitary convenience or ashpit communicating directly with them; in not having any cistern for supplying water to them connected in any way with a water-closet; in having no drain openings inside; and in having no sleeping place connected with them.

The bakehouses are distributed over the district as follows:—

Chorlton-cum-Hardy	18
Withington	19
Didsbury	9
Burnage	1
	47

There are no cellar-bakehouses in the district.

3.—*Homework.*

Information with regard to persons in the district taking in homework from places of business outside the district has been received in 23 instances during the year. These premises have been inspected and registered, as in the case of other workshops. The number of visits paid during the year to premises in which homework has been carried on is 129. No infectious fevers have been notified during the year as occurring in connection with the premises occupied by homeworkers.

In 3 instances employers living in this district have been reported as giving out work to homeworkers who live in other districts. The names and addresses of these homeworkers have been sent to the sanitary authorities of the districts in which they live.

4.—*Workplaces.*

Under this heading the following are classified :—

New buildings in course of erection, 87 ; fish and game shops, 13 ; Cab-yards and stables, 11 ; slaughter-houses, 4—total 115.

In the case of new buildings, it was found that in 18 instances no sanitary accommodation existed for the workmen. A verbal request was sufficient to have satisfactory accommodation provided. In 2 instances the accommodation provided for the men was found to be unsatisfactory, but upon a verbal request being made the necessary alterations were carried out.

Total number of visits to workplaces during the year, 419.

5.—*Factories.*

There are 20 premises in the Withington district in which mechanical power is used.

These are as follows :—

Laundries, 6; printers, 3; bootmakers, 2; joiners, 2; cycle makers, 2; brickmakers, 2; sawmill, 1; blacksmith, 1; and mechanics, 1—total number of visits to factories during the year, 95.

Workshops.

Number of visits	Number in which Sanitary defects were found and reported to the Medical Officer of Health	Number of reports referred to Factory Inspector (unregistered workshops)	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register	Number of visits to houses where out-workers are employed	Factories and Workshops not provided with proper means of escape in case of fire
3551	6	6	0	57	594	129	0

Number of visits	Number in which Sanitary defects were found	Number of reports referred to Factory Inspector	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register
352	1	0	0	7	47

1.—Inspection.

Premises	Number of		
	Inspections	Written Notices	Prosecutions
Factories...	95	0	0
Workshops	2908	4	0
Workplaces	419	0	0
Homeworker's Premises	129	0	0
Total	3551	4	0

2.—Defects Found.

Particulars	Number of Defects			No. of Prosecutions
	Found	Remedied	Referred to H.M. Inspector	
Nuisances under the Public Health Acts :—				
Want of cleanliness	107	107	0	0
Want of ventilation	1	1	0	0
Overcrowding	1	1	0	0
Sanitary Accommodation (Section 22 adopted)				
Insufficient	24	23	0	0
Defective	2	2	0	0
Not separate for Sexes...	0	0	0	0
Offences under the Factory and Workshop Act	0	0	0	0
	135	134	0	0

3.—Other Matters

Class	Number	
Matters notified to H.M. Inspectors of Factories :—		
Failure to affix abstract of the Factory and Workshop Act (S. 133)	6	
Action taken in matters referred by H.M. Inspectors as remediable under the Public Health Acts but not under the Factory Act (S. 5)—		
Notified by H.M. Inspector	0	
Reports (of action taken) sent to H.M. Inspectors.	0	
Other	0	
Underground Bakehouses (S. 101) :—		
In use during 1903	8	
Certificate granted in 1905	0	
Certificate granted in 1906	0	
In use at the end of 1906	0	
Homework :—	Number of	
	Lists	Outworkers
List of Outworkers (S. 107) :—		
Lists received	2	23
Addresses of outworkers forwarded to other authorities		3
Addresses of outworkers received from other authorities		23
	Wearing Apparel	Other
Homework in unwholesome or infected premises :—		
Notices prohibiting homework in unwholesome premises (S. 108)	0	0
Cases of infectious disease notified in homeworker's premises	0	0
Orders prohibiting homework in infected premises (S. 110)	0	0
Workshops on the Register (S. 131) at the end of 1905 :—		
Dressmaking		132
Bootmakers		65
Joiners		31
Plumbers		24
Blacksmiths and Wheelwrights		16
Decorators		17
Millinery		38
Ironmongers		15
Cabinetmakers		15
Tailors		19
Bakers		47
Laundries		11
Hairdressers		13
Monumental Masons		5
Saddlers		7
Printers		3
Watchmakers		7
Picture Framing		1
Knitting		1
Golf Balls		1
Cycles		6
Bottling Stores		1
Brickworks		2
Workplaces		115
Rubber Heels		1
Mechanics		1
Total number of Workshops on Register		594

APPENDIX.

The Midwives Supervising Committee present, for the information of the City Council, the following reports of their officials of the operations carried on in Manchester during 1906 under the Midwives Act, 1902:—

Statement by Dr. Niven, Medical Officer of Health.

The Medical Officer of Health does not consider it necessary to make extensive observations to the Midwives Supervising Committee on the working of the Midwives Act, 1902, during 1906, as he gave, in the Annual Report for 1905, an account of the labours of the Committee at the initiation of their work, and at the same time emphasised what he regarded as the more important features of the Act so far as Manchester is concerned.

He would, however, call attention not only to the admirable work which Dr. Merry Smith is doing, both in the matter of instruction and in administrative work, but also to the important gaps in the administration of the Act which are not filled up.

It will appear, in the course of the report, that it has not been possible to devote that attention to still-births which the subject demands. More particularly the discrepancy between the number of still-births registered at the cemeteries and the number notified by the midwives deserves consideration. In their new rules, the Central Midwives Board advise that the midwives should notify to the supervising authority every birth occurring in their practice. This, however, will be a barren gain unless provision be made for educated counsel to those mothers who may stand in need of it. It is also highly desirable that all abortions and premature births should be notified, and special attention is called to the valuable suggestion of Dr. Merry Smith that the registration of births should include a statement of the attendant at the birth, whether such attendant be a medical practitioner or a midwife, or a handy woman.

Attention is again drawn to the necessity for a rule that midwives shall, at each visit to a woman during the lying-in period, take and record the temperature in a book to be produced at the request of the accredited Officer of the Midwives Supervising Committee.

Dr. Merry Smith has clearly stated the reasons which render such a rule essential, and has demonstrated its workability.

The need of a definition of Puerperal Fever for working purposes has, on various occasions, been urged by your Medical Officer of Health, and a sub-committee of the North Western Branch of the Society of Medical Officers of Health, with the valuable assistance of Sir W. J. Sinclair, framed such a definition, which is once again placed before the medical profession through the Supervising Authority.

It runs thus :—

> "For the purpose of the Notification Acts, 1889 and 1899, the term 'Puerperal Fever' shall include all cases in which, within seven days after the birth of a child, alive or still-born, the mother shall have a rise of temperature exceeding 100·4° F. with quick pulse, maintained for a period exceeding 24 hours, without any obvious cause other than the Puerperal state. It shall also include all cases in which, within seven days after the birth of a child, there has been the occurrence of rigor (with attendant illness) without any obvious cause other than the Puerperal state."

The increase of Puerperal Fever in 1906 is not the result of any extension of notification, however, as is made evident by a study of the case mortality.

The great service rendered to the community by Dr. Gordon in undertaking and successfully performing the severe operations arising out of the cases of Puerperal Fever sent to Monsall Hospital will be gathered from the account given by him of the work done in this department at the hospital during the year.

The Supervising Committee and the Medical Sub-Committee have given much and regular attention to the working of the Act and of the rules. They have the gratification of seeing that their suggestions towards the emendation of the rules have been duly considered, and, in part, adopted.

As there is still much ground to be covered under the existing procedure, which is working well, it does not appear necessary that the Act should be discussed further on this occasion.

The Committee have to deplore the loss of one of their medical members by death. Dr. Margaret Bell had made for herself a high place in the general esteem, on account of her professional ability, no less than for her kindness of disposition. The vacancy thus caused has been filled by the appointment, as a co-opted member, of Mrs. Maud Hamilton McNaughton.

In conclusion, no attentive reader of the report of your Executive Officer can fail to be struck with the urgent need which exists for the appointment of an additional officer if the rules are to be fully carried out, or if the benefits derivable from these rules are to be adequately realised

Extract from a Report by Dr. A. Knyvett Gordon, Medical Superintendent of the Monsalll Fever Hospital, in reference to the treatment of cases of Puerperal Fever in Hospital during 1906.

Puerperal Fever.

During the year 1906, 49 patients have been discharged who had suffered from Puerperal Fever. The clinical study of these cases has elicited some facts which are interesting from the surgical point of view, but on this aspect of the matter I do not intend to dwell in this report.

I append a table showing some of the salient features of each case, and on which I propose to comment briefly as follows :—

(1) *The results.*—There is a gross mortality of 12 cases, or 24·4 per cent. Of these, four were moribund on admission, and died within 24 hours of their arrival. Of the remaining eight, one died from an attack of Pneumonia, which commenced six weeks after admission, and had no apparent connection with the original illness. In only two instances was the patient not obviously in danger of her life on admission.

The average interval elapsing between the calling in of the doctor by the midwife, or (in cases where he was in attendance from the confinement) from the onset of the fever, to the notification of the case was four and a half days. In other words, what is admittedly the most important part of the illness from the point of view of treatment had passed before the patient was admitted.

With regard to those discharged as cured, it is necessary to observe that they were all detained until they were free from pelvic pain on exertion ; the average duration of this detention was, in the case of the recoveries, 60 days. Any operation that was necessary for the treatment of the consequences of the puerperal infection was performed before the patient left Monsall.

(2) *The cause of the illness.*—The cases have been divided into those attended at the confinement by a medical man, by a midwife, and by neither. The "doctors'" cases are 28 in number, and the "midwives'" 16. It does not, however, follow that in all cases where the doctor was in attendance that he was responsible for the infection, for in many of these a nurse of some sort or other was present too, and probably made internal examinations. From other considerations, it is probable that the incubation period of puerperal sepsis does not exceed 48 hours, so, where this interval had elapsed between the last examination of the doctor and the initial rigor or rise of temperature, the doctor must be held blameless—except, perhaps, in so far as his responsibility for the acts of the nurse goes.

In 11 of the 28 cases there was a history of the use of forceps, combined with clinical evidence of a variety of laceration of the parts which could not have been caused by natural means alone.

In the "Doctors'" cases the onset of the pyrexia occurred within 48 hours in eight instances, and the average length of the latent period was three days. In two only of the "midwives'" cases was the onset within 48 hours, and the average length was four-and-a-half days.

It would appear, then, that in the bulk of the "midwives'" cases the infection took place during the puerperium, and not at the time of delivery. The factors that suggest themselves here are the neglect to adequately protect the genitalia after delivery and the use of vaginal douches. It is not necessary that these latter should have been given with a dirty instrument.

From the clinical point of view, I am strongly of the opinion that midwives should not be allowed to use the vaginal douche except under the direction of a medical man. In point of fact, the conditions under which vaginal douching might be necessary are covered by those in which she is, under the regulations, obliged to summon medical aid.

(3) *The bacteriology of the cases.*—In every instance a bacteriological examination was made in the hospital laboratory of the contents of the uterus, the results of which were as follows:—Streptococci were present in 29 cases; bacillus coli communis was present also in five of the streptococcal cases, and in one case it was the only organism present. Gonococci were found alone in two cases, and staphylococci in one case. In one other instance, a bacillus was present the nature of which was not fully determined. In 15 there was either no growth on the tubes or some suspicion of vaginal contamination having occurred in the swab.

In 27 instances blood withdrawn from the basilic vein was examined also. This was apparently sterile in 19 cases, while streptococci were present in eight. The proportion of cases in which streptococci were found is this year greater than heretofore, while bacillus coli occurred less frequently. It is possible that this may be due to the fact that in former years the proportion of midwives' cases admitted has been higher. To settle this point, it would be necessary to examine a larger number of cases, and not only those which have been admitted to hospital. At Monsall we do not see the milder varieties of puerperal infection.

(4) *The nature of the lesion.*—There were 18 cases of retention of placenta or membranes, with one death. The illness was apparently due to injuries from the use of instruments in seven cases, all of which recovered. General peritonitis was present (on admission) in eight cases, with four deaths; all were

CASES OF PUERPERAL FEVER DISCHARGED DURING 1906.

No.	Initials	Day of onset of Fever	Day of disease on admission	Days elapsing between calling in of Doctor and Admission to Hospital	Doctor or Midwife	Forceps	Curetting of Uterus	Other Operations	Serum	Bacteriology of Uterus	Bacteriology of Blood	Complications	Days in Hospital	Result
1	E.M.	2	3	..	Dr.	No	Yes	Incision of Pelvic abscesses	Yes	Bacillus Coli Communis, Streptococci	Not examined	.....	218	Recovered
2	M.J.	3	6	..	Dr.	No	Yes	Incision of Pelvic abscess	Yes	Streptococci	Not examined	.....	136	Recovered
3	E.B.	3	4	..	Dr.	No	No	Laparotomy	No	Bacillus Coli Communis, Streptococci	Not examined	Severe injuries and general Peritonitis from instrumental dilatation	95	Recovered
4	E.C.	4	3	Same day	M.	No	Yes	.....	Yes	Bacillus Coli Communis, Streptococci	Not examined	.....	38	Recovered
5	A.P.	1	2	..	Dr.	No	Yes	.....	Yes	No growth	Not examined	.....	36	Recovered
6	S.A.C.	4	3	2	M.	..	Yes	.....	No	No growth	Not examined	.....	25	Recovered
7	B.B.	5	5	2	M.	..	No	Laparotomy	No	Gonococcus	Not examined	General Peritonitis (on admission)	81	Recovered
8	M.T.L.	5	5	4	M.	..	Yes	.....	No	No growth	Not examined	.....	39	Recovered
9	M.A.	6	4	2	M.	..	Yes	.....	No	Staphylococci	Not examined	.....	39	Recovered
10	E.B.	4	2	..	Dr.	No	Yes	Laparotomy (on admission)	Yes	Streptococci (+ a bacillus of the coli group)	Not examined	Intestinal obstruction also (on admission)	51	Recovered
11	S.C.	7	3	4	M.	..	Yes	.....	Yes	No growth	Not examined	.....	30	Recovered
12	M.H.	6	3	2	M.	..	Yes	Vaginal Hysterectomy	No	No growth	Not examined	.....	5	Died
13	F.H.	2	4	..	Dr.	Yes	Yes	.....	Yes	Streptococci	Streptococci	.....	48	Recovered
14	M.R.	2	4	..	Dr.	No	No	.....	Yes	Streptococci	Not examined	Extensive laceration from manual extraction of placenta	47	Recovered
15	R.H.	7	6	..	Dr.	No	No	Laparotomy	No	Streptococci (+ Bacillus Coli Communis)	Streptococci	General Peritonitis (on admission)	1	Died (24 hours)
16	C.W.	4	3	3	M.	..	Yes	.....	No	No growth	Sterile	.....	2	Died (48 hours)
17	M.D.	3	4	..	Dr.	No	Yes	.....	Yes	Streptococci	Streptococci	Late Pneumonia	58	Died
18	M.T.H.	2	4	3	Neither	..	No	.....	No	Gonococci + Streptococci	Not examined	General Peritonitis (on admission)	½	Died (12 hours)
19	F.E.M.	5	7	..	Dr.	No	Yes	.....	Yes	Streptococci	Streptococci	.....	50	Recovered
20	L.B.	4	9	..	Dr.	No	No	Laparotomy	No	.....	Not examined	General Peritonitis (on admission)	68	Recovered
21	A.A.	3	3	2	M.	No	Yes	Vaginal Hysterectomy	Yes	Streptococci	Not examined	.....	11	Died
22	M.P.	11	8	8	M.	No	Yes	Laparotomy	No	.....	Not examined	General Peritonitis (on admission)	79	Recovered
23	J.C.	3	5	..	Dr.	Yes	Yes	Laparotomy	Yes	Streptococci	Streptococci	Pyosulpina	60	Recovered
24	E.H.	4	3	..	Dr.	No	Yes	.....	Yes	Streptococci	Not examined	.....	34	Recovered
25	E.H.	8	3	11	Neither	No	Yes	.....	No	.....	Not examined	.....	24	Recovered
26	M.G.	2	3	2	M.	No	Yes	.....	No	Streptococci	Not examined	.....	28	Recovered
27	M.C.	2	2	..	Dr.	Yes	Yes	Laparotomy	Yes	Streptococci	Streptococci	General Peritonitis (on admission)	76	Recovered
28	M.L.	2	10	..	Dr.	Yes	Yes	Vaginal section	No	.....	Not examined	Pelvic abscess	1	Died (24 hours)
29	M.O.	5	6	..	Dr.	Yes	Yes	.....	Yes	Bacillus Coli Communis	Sterile	Pyæmia	97	Recovered
30	B.D.	5	2	4	M.	No	Yes	.....	No	Streptococci	Sterile	.....	26	Recovered
31	B.M.	3	7	..	Dr.	No	Yes	Abdominal Hysterectomy	No	Streptococci	Sterile	General Pelvic Suppuration	6	Died
32	E.F.	5	2	2	Neither	No	Yes	.....	No	Streptococci	Sterile	.....	18	Recovered
33	M.S.	1	6	..	Dr.	No	Yes	Laparotomy	No	Streptococci	Streptococci	General Pelvic Suppuration	3	Died
34	F.C.	4	3	..	Dr.	No	Yes	Laparotomy	No	Streptococci	Streptococci	General Pelvic Suppuration	3	Died
35	L.G.	4	5	..	Dr.	Yes	Yes	Laparotomy	Yes	Streptococci	Sterile	Large Pyosalpinx	75	Recovered
36	M.E.H.	7	5	2	Neither	No	Yes	Laparotomy	Yes	.....	Sterile	Pelvic Suppuration	45	Recovered
37	E.S.	2	4	..	Dr.	Yes	No	Laparotomy	No	Streptococci	Sterile	.....	½	Died (12 hours)
38	H.P.	4	2	1	Neither	No	Yes	.....	No	.....	Sterile	.....	19	Recovered
39	E.H.	6	3	..	Dr.	Yes	Yes	.....	No	Streptococci	Sterile	.....	40	Recovered
40	M.B.	7	2	..	Dr.	Yes	Yes	.....	No	Streptococci	Sterile	.....	32	Recovered
41	E.S.	3	2	1	M.	No	Yes	.....	No	Streptococci	Sterile	.....	30	Recovered
42	E.H.	3	6	5	M.	No	Yes	.....	No	Streptococci	Sterile	.....	44	Recovered
43	M.S.	5	5	..	Dr.	No	Yes	.....	No	.....	Sterile	.....	49	Recovered
44	L.H.	3	13	..	Dr.	Yes	Yes	Polvic incision	No	Streptococci (+ Bacillus Coli Communis)	Sterile	.....	54	Recovered
45	M.M.	4	4	..	Dr.	No	Yes	.....	Yes	.....	Sterile	.....	32	Recovered
46	M.C.	4	4	..	Dr.	No	Yes	.....	Yes	Streptococci (+ Bacillus Coli Communis)	Sterile	.....	32	Recovered
47	K.W.	6	3	7	M.	No	Yes	.....	No	A bacillus not identified	Sterile	.....	40	Recovered
48	M.J.W.	8	5	..	Dr.	Yes	Yes	.....	No	Streptococci	Sterile	.....	22	Recovered
49	C.R.	2	3	4	M.	No	No	Laparotomy	Yes	Streptococci	Not examined	General Peritonitis (on admission)	1	Died (24 hours)

treated by laparotomy. Pelvic suppuration was present (but shut off by adhesions from the general peritoneal cavity) in three cases on admission—all fatal. This does not include those cases in which this complication occurred in the convalescent period, in which the results were much better. There was a condition of general septicæmia, without obvious lesion, in 13 cases, with four deaths: in all probability, some of these were suffering from septic endometritis, but until a satisfactory definition of that condition is produced, I think it better not to label these cases at all.

(5) *The treatment adopted.*—In all but eight cases the uterus was curetted on admission with a sharp curette of special construction, followed by a rubbing of the raw surface with swabs soaked in undiluted izal fluid. The uterine cavity was then packed with izal gauze. Vaginal douching was not employed at all, nor intrauterine douching, except when the hæmorrhage from curetting was severe. Extirpation of the uterus was tried as a last resort in three instances, but without success. Of the method employed elsewhere of removing the uterus before the patient becomes dangerously ill, I have not had any experience. Laparotomy, apart from hysterectomy, was performed for one purpose or another in 14 cases, with four deaths.

Antistreptococcic serum was given in 20 cases, in 16 of which streptococci were found in the uterus, and in the blood also in five cases. The dose was either 50 or 100 cubic centimetres.

It is only necessary to add that the admission of cases of Puerperal Fever to an isolation hospital is a great strain on the nursing staff. At Monsall this work has been performed without any addition to the staff, and that often at times when the accommodation of the hospital has been severely taxed by epidemics of other diseases.

Statement by the Executive Officer, Margaret Merry Smith, M.B., Ch.B., D.P.H. Edin.

Statistics Relating to Midwives.

The number of midwives who gave notice of their intention to practice in Manchester during 1906 was 160; of these 20 reside without the City.

The following table gives particulars relating to midwives practising in Manchester, and sets forth their qualifications prior to entry on the Midwives' Roll. It will be seen that more than 60 per cent. are certificated midwives.

It also contains under the separate headings the number of labours attended by midwives, the cases of Puerperal Fever, with other details in relation to these, and the number of suspensions, with the reasons therefor.

TABLE A.—PARTICULARS RELATING TO MIDWIVES PRACTISING IN MANCHESTER.

Qualification of Midwife.	Bona-fides.	St. Mary's Hospital.	Maternity Hospital.	London Obstetric Society.	Queen Charlotte Hospital.	Liverpool Lying-in Hospital.	Rotunda Hospital.	Central Midwives Board.	Total.	Column.
No. notifying their intention to practice in Manchester in 1906 — Resident in Manchester...	51	31	18	32	1	3	1	3	140	1
No. notifying their intention to practice in Manchester in 1906 — Resident outside Manchester...	11	6	...	2	...	...	...	1	20	2
No. removing from Manchester area.....	1	1	1	...	...	...	...	...	3	3
No. given up practice	1	1	...	...	...	...	...	...	2	4
No. who have died.....	1	...	...	...	...	...	...	...	1	5
No. suspended *sine die*	1	1	...	...	...	...	...	...	2	6
No. removed from Roll.....	1	...	...	...	...	...	...	...	1	7
No. of births attended by midwives under the heading given	3208	3214	2006	2239	85	189	13	175	11129	8
No. of cases of puerperal fever attended by midwives under the heading given	15	13	11	8	...	2	...	...	49	9
Deaths amongst cases of puerperal fever attended by midwives	4	3	1	1	...	1	...	...	10	10
Per cent. of puerperal fever amongst all classes attended.....	0·47	0·40	0·55	0·36	...	1·06	...	...	0·44	11
Per cent. of puerperal fever amongst cases attended by midwives having puerperal fever in their practise	1·45	0·80	0·67	1·10	...	1·06	...	...	0·96	12
No. of suspensions on account of — Puerperal fever.....	13	14	11	8	...	2	...	1	*49	13
No. of suspensions on account of — Suspicious cases—Knowledge of rules, no appliances, etc.	4	4	3	...	...	...	...	...	11	14

* Eleven midwives were each suspended twice, one four times, and one five times.

Details of the Work of the Executive Officer.

Inspection Visits to Midwives.

The routine method of inspection which was outlined in last year's report was again followed:

1.—Examination of the sanitary condition of the house:

In five instances defects were referred to the Sanitary Department and action was taken. Three houses were dirty. There was a marked improvement in the cleanliness of many of the houses, and in the cleanliness of the bed linen. In each house there was either a fixed or sitz bath; these were used regularly.

2.—Inspection of the bag of appliances:

The improvement in the equipment of the bags of appliances, and in the standard of cleanliness of these, was great. It was maintained throughout the year.

The bags in almost every instance were commodious, and not unduly heavy. The detachable lining was fixed by means of buttons or hooks, and there was no intervening lining between it and the leather of the bag. This arrangement makes thorough cleansing of the bag an easy process. When the lining is changed, the midwives are instructed to sponge the bag within and without with a solution of 1-1000 perchloride of mercury. The importance of careful disinfection of the handle at the same time has also been emphasised.

The bags have been disinfected thus once a week, and the lining changed weekly or oftener as necessity arose. All linen bags used to cover appliances were changed weekly.

Appliances for vaginal injections.

Vaginal douche tins with rubber tubing, or syphon douches and glass nozzles, were carried, and were used in almost every case to give douches where such were required. The practice which formerly prevailed of douching a patient immediately after labour, and regularly during the lying-in period, has been given up by the midwives. While they are repeatedly warned that routine douching is dangerous, it is necessary that they should carry with them a suitable appliance sterilised and ready for an emergency, or for use when ordered by a doctor called in to attend an abnormal case. Higginson's syringes are not suitable appliances, and should not be so used.

As stated in last year's report, a Higginson's syringe was formerly often used, without intervening disinfection. to give vaginal and rectal injections, but this dangerous practice has been given up.

In two cases of Puerperal Fever occurring during 1906 in the practice of midwives, the patients were douched immediately after the labour or before symptoms of illness began. In one case, a Higginson's syringe was used as a douche.

Appliances for giving enemata.

Higginson's syringes were carried for this purpose. They were enclosed in calico or waterproof bags.

Other Appliances.

The nail brushes were kept in much better condition than during 1905, but the midwives have not yet realised the importance of sterilising a brush before use at a labour. In three instances the midwife had no brush at the time of inspection. A disinfectant soap was in most cases carried.

In all but three cases clinical thermometers were carried, and were in order.

A female metal or glass catheter, or a soft male rubber one, was carried ; in two cases the midwife had none.

Midwives are discouraged from using catheters, and those who are ignorant of its use are advised never to pass one. It is necessary, however, that they should carry one for emergencies.

Scissors were kept clean, and in good order, except in one or two cases.

The antiseptics carried are (*a*) perchloride of mercury in pellets, as a disinfectant for the hands ; (*b*) lysol, for douching purposes ; (*c*) boracic acid, to cleanse the infant's eyes.

In two cases the midwife had no adequate antiseptic.

The antiseptic lubricant most generally used was glycerine of perchloride of mercury in a 1-1000 solution. In only one case during the year was an open pot of vaseline found.

Ligatures for the cord were carried in bottles, boiled, and ready for use.

In 11 cases the appliances were incomplete at the time of inspection. Nine belonged to midwives residing within and two to midwives residing without the City. In nine cases (all midwives residing within the City) one or other of the appliances was dirty. In one case, that of a midwife

residing without the City, the bag and appliances were dirty and unsatisfactory throughout. In several instances a very dirty bag was used to carry the necessary appliances for puerperial visits.

As a rule, the bag of appliances kept by the midwife was carried to cases, and the appliances were used. In some instances, however, the appliances were not used, the midwife thinking she had fulfilled all the requirements by carrying them to the case. One such instance was observed.

One midwife kept the well-equipped bag at home ready for inspection. The necessary appliances for the labour were carried in a capacious petticoat wallet.

The midwives now understand much better how to keep their bag and appliances in order. In most instances they have been practically drilled by myself in the routine method of disinfection and sterilising required, each fortnight or month (according to the number of cases attended), or in every septic or puerperal fever case.

3.—Examination of registers, medical record books, notification books, and temperature record books:

Registers.

Entries in registers were more complete and were fairly well up to date. In ten instances (midwives residing within the City) cases had not been entered up for some time previous to the inspection visit. In three instances (two residing within and one without the City) the registers were very badly kept, and in other three were very incomplete. In one instance it was proved that false entries were made.

The inspection of registers under existing conditions is unsatisfactory. In order to check entries in registers, it is necessary to make an investigation of the mode of practice of the midwife in question using such entries as the basis. This is a laborious business, and the chance of finding the inaccuracy in some cases remote.

It was employed on several occasions where it was felt that the midwife's work was unsatisfactory, and the results were very valuable. Wilful falsification of registers has been proved. The knowledge that such a check has been imposed has probably led to more accurate registration.

It is, however, necessary that a simpler method should be available. Registration of the name, qualification, and residence of the attendant at a confinement should be made compulsory when a birth is registered. The information would thus be at the disposal of the Local Supervising

Authorities; without such compulsory registration the chance is remote that false or incomplete returns made by midwives will be found out. In view of the fact that after 1910 it will be illegal for handy women to attend cases of labour habitually, it is also most important that steps should be at once taken to obtain such registration.

Records of calling in Medical Aid.

These were unsatisfactorily kept by 11 midwives. It was chiefly where medical aid was called in for the child that records were not sent in.

Notifications of still-birth, death of newborn child, or death of mother.

In 10 cases of still-birth no record was sent in. Returns from the Cemeteries enabled this to be checked.

Temperature Record Books.

The midwives made marked progress in this department also. All were trained to take and to record temperatures, and could do so at the time of inspection. When they realised that it was compulsory, those who had at first demurred, stating they could not and would not do this thing, quickly made it their business to learn. Some of the midwives could not make figures. They were taught by their children, and now record the temperatures taken.

While all could take and record temperatures at the time of inspection, they did not always do so at their cases. Ten midwives had no records of temperatures, and 16 kept very unsatisfactory records. At many cases of labour the temperature was never taken. This also happened during the lying-in period.

It is of the utmost importance that midwives should be able to take and to record temperatures. A raised temperature is generally the first danger signal that all is not well with the lying-in woman. If a midwife takes the temperature at each daily visit she will notice at once if the woman is ill, and will call in a doctor as required by the rules of the Central Midwives' Board if it remains above 100·4° F. with quickening of the pulse for 24 hours. If, however, she does not take the temperature she cannot carry out this rule, and medical aid is often called in too late.

In the cases of Puerperal Fever occurring in Manchester since the Midwives Act has been in force, it has been repeatedly brought out during the investigations that owing to the neglect of the midwife to take the temperature daily at each visit the onset of the fever has been unnoticed,

and cases at first mild became serious before medical aid was called in. Preventable deaths have thus occurred. Moreover, the midwife took no special precautions before attending her other cases. Infection thus occurs, and cases of Puerperal Fever, mild or fatal, result. The after results of even a very mild Puerperal Fever case are serious.

No care should be spared to instruct midwives in the use of the thermometer, and the taking and recording of temperatures should be made compulsory. If a woman cannot use a thermometer she is not fit to be a midwife. Pulse taking is more difficult, although, wherever possible, midwives should be trained and required to do this and to record results. Efforts meanwhile are best concentrated on training midwives in temperature taking.

4.—Inspection of washing dresses and aprons:

The midwives possessed an adequate supply of such clothing. One midwife while at a labour was wearing dirty uniform. During the visits the importance of wearing clean underclothing, washable throughout, was emphasized, as was also the necessity for having clean bed linen.

5.—Examination of the general appearance of the midwife and the condition of her hands:

It was possible this year to judge the capacity and reliability of the midwives more correctly.

Instruction was again given on the value of personal cleanliness, and on the care of the hands.

6.—Examination of the midwife's mode of procedure during attendance on lying-in women, and of her knowledge of the rules of the Central Midwives' Board:

A better grasp of the details of the precautionary cleansing and antiseptic requirements was shown. This knowledge was practically tested by inquiries in the course of investigation of cases conducted.

Investigations of the Mode of Practice of Midwives.

The mode of practice of 71 midwives was investigated in the house of the patient throughout the year.

In all, 368 lying-in women were thus visited.

The method of conducting a labour was observed in only three instances. In one case the mode of conduction was satisfactory throughout. In the others it was not. One midwife carried, but did not use, her appliances; the cleansing and antiseptic precautions carried out by the other were quite inadequate.

In 32 cases the visits to lying-in women were paid with the midwife in charge. Such visits were most valuable, as it was possible to judge of the practical capacity of the midwife, and to form an estimate of the difficulties to be overcome in nursing lying-in women in poor homes.

In some cases the midwife had instructed the women, as advised during inspection visits, regarding the simple hygiene of the home and person, and the feeding of the nursing mother and the child. In other cases the midwife taught the mother nothing during her visit.

In 56 cases, where the investigation was made as part of an ordinary inspection visit, the midwife was not present at the time.

In only one case during the year was any objection raised by the patient to such an inspection visit. In most cases where the object was explained it was welcomed, as the people realised it was for their benefit and protection. Many testified during these visits to the greater care now taken by midwives.

In three instances outside complaints were received regarding work done by midwives. In one case such a complaint was decidedly justifiable, as revealed by a thorough investigation of her work.

In three cases visits were paid by request of the midwives to view the condition of the house and bedding.

In 49 cases the investigation was carried out because the midwife had Puerperal Fever in her practice at the time, while in 12 others the cases were suspicious of Puerperal Fever. In 60 cases it was done because of the reasons given for calling in medical aid, in 70 cases because of still-births, and in 22 because of deaths of new-born children occurring in their practice.

Visits with midwives to their cases and investigation of their mode of practice is one of the most important parts of inspection work. It is to be regretted that it was impossible throughout the year to do more along these lines, independent of the Puerperal Fever or penal investigations, which had to be undertaken. It is infinitely better to prevent disease than to attempt to cure it. If the reasons for the extreme care required are drilled into the midwife by the bedside of the patient both will realise the wisdom of these, and will in most cases try in future to secure better conditions. Women who are about to become mothers should know what to provide for the confinement, and should also know what care they ought to receive at the time. It is necessary to educate public opinion in this matter, and then the slovenly careless midwife will not be employed.

Handy Women.

A register of handy women is kept.

Eleven visits were paid to them throughout the year, and the women interviewed. In the majority of cases the knowledge of the existence of these women was obtained because they had been in attendance on a reported case of Puerperal Fever. Nothing was done beyond carrying out disinfection in the special case and giving general instruction in the methods of cleanliness to be observed when in attendance on lying-in women.

Uncertified Midwives.

In three instances letters were sent requesting the woman to desist from the practice of calling herself a midwife, and so far as can be ascertained these requests have been complied with.

Puerperal Fever.

100 cases of Puerperal Fever were notified during 1906, and in addition to these 3 have been added, of which information was obtained from the death registers. 95 cases occurred after confinement and 8 cases after abortion. The total number of fatal cases, which includes the cases from the death registers, was 30.

The day of onset of illness in 64 out of the total 103 cases was on or before the fourth day. In 96 cases it was on or before the eighth day. In some of these cases, where the onset of symptoms was apparently late, it is more than probable that early mild symptoms passed unnoticed.

Of the fatal cases, 9 died within the first week after the confinement, 11 within the second, 3 within the third, and 2 within the fourth. The remaining 5 died within two months.

Notification of cases was carried out earlier than during 1905. 51 cases were notified as Puerperal Fever within three days of the onset of the illness, and 87 within seven days; 11 cases were notified in the second week after the onset, and 2 cases in the third week.

The midwife attended alone at the confinement in 32 cases of Puerperal Fever. In 18 of these the doctor was called in within 24 hours of the onset of the illness. In 8 cases he was called in on the second day, in 4 on the third day, in 1 on the fourth day, and in 1 on the ninth day.

Raised temperature was recorded to be present in all but two cases; in these there is no record. The rise in the majority of the cases marked the onset of the illness, and occurred early.

In several cases where the temperature was not taken the doctor was not called in until late, and what would have been a mild case if attended to at the onset became a serious or fatal one.

If midwives take the temperature daily, their attention is called at once to the fact that something is wrong if a rise occur. Medical aid is called in sooner, and special disinfecting precautions are taken. This safeguards the special patient in question, and also the other women who are being attended at the same time.

The practice of giving vaginal douches at the time of confinement or during the puerperium has been discouraged.

During 1906 a vaginal douche was given before there was raised temperature in 16 out of the total cases notified.

The following figures give particulars on this point for the Puerperal Fever cases for 1905 and 1906. The classification is based on whether douches were given during the lying-in period before the onset of illness :—

	1905	1906
Definite history that a douche was given	6 ..	16
„ „ „ not given	49 ..	71
No history either way.....	21 ..	16
	76	103

In three cases only during 1906 did a midwife give a vaginal douche before the onset of the illness. In one case she did so by a doctor's order, using a vaginal-douche can for the purpose. In the second she did so on her own initiative ; in the third case she did so without orders, using a Higginson's syringe for the purpose, which was also used to give enemas.

Section of Table B giving the number of Midwives resident outside but practising in Manchester.

Salford	11
Failsworth	2
Stretford	2
Gorton	2
Eccles	1
Levenshulme	1
Droylsden	1
	20

TABLE B.—GIVING IN DISTRICTS FOR 1906 THE POPULATION OF MANCHESTER; BIRTHS AND BIRTH-RATES; CASES, ETC., OF PUERPERAL FEVER; AND THE NUMBER OF MIDWIVES RESIDENT IN EACH DISTRICT.

Statistical Divisions		Population	Births Registered		Cases of Puerperal Fever				1906 Midwives resident in Manchester.
			Number	Rate	Total Attacks	Deaths	Attack rate per 1,000 births	Case Fatality per cent.	
City of Manchester		**637,520**	**18,397**	**28·86**	**103**	**30**	**5·60**	**29·1**	**140**
I.	Manchester Township	128,040	4,122	32·19	24	6	5·82	25·0	20
II.	North Manchester	187,201	5,357	28·62	38	13	7·09	34·2	34
III.	South Manchester	322,279	8,918	27·67	41	11	4·60	26·8	86
I.	Ancoats	43,575	1,531	35·13	12	4	7·84	33·3	6
I.	Central	26,383	746	28·28	7	1	9·38	14·3	7
I.	St. George's	58,082	1,845	31·77	5	1	2·71	20·0	7
II.	Cheetham	41,004	1,172	28·58	12	4	10·24	33·3	6
II.	Crumpsall	9,301	193	20·75	1	1	5·18	100·0	1
II.	Blackley	9,573	284	29·67	4	3	14·08	75·0	3
II.	Harpurhey	20,989	499	23·77	4	1	8·02	25·0	2
II.	Moston	17,935	453	25·26	1	..	2·21	..	5
II.	Newton	38,521	1,084	28·14	4	2	3·69	50·0	8
II.	Bradford	24,997	897	35·88	6	1	6·69	16·7	7
II.	Beswick	12,377	435	35·15	3	..	6·89	..	..
II.	Clayton	12,504	340	27·19	3	1	8·82	33·3	2
III.	Ardwick	44,261	1,355	30·61	6	2	4·43	33·3	6
III.	Openshaw	28,600	941	32·90	10	4	10·62	40·0	9
III.	West Gorton	31,529	900	28·55	1	..	1·11	..	8
III.	Rusholme and Kirkmanshulme	26,355	803	30·47	1	..	1·25	..	12
III.	Chorlton-upon-Medlock	56,361	1,313	23·30	7	2	5·33	28·6	17
III.	Hulme	64,062	2,230	34·81	10	3	4·48	30·0	17
III.	Moss Side	28,105	604	21·49	3	..	4·96	..	4
III.	Withington	43,006	772	17·95	3	..	3·88	..	13

TABLE C.—SHOWING THE NUMBER OF CASES OF PUERPERAL FEVER OCCURRING WEEK BY WEEK DURING 1906, ACCORDING TO DATE OF ONSET.

1st Quarter		2nd Quarter		3rd Quarter		4th Quarter	
Jan. 6	–	April 7	3	July 7	1	Oct. 6	5
13	1	14	2	14	3	13	2
20	1	21	1	21	2	20	5
27	2	28	5	28	–	27	4
Feb. 3	2	May 5	1	Aug. 4	1	Nov. 3	2
10	3	12	1	11	4	10	2
17	3	19	–	18	1	17	5
24	2	26	1	25	2	24	7
March 3	1	June 2	1	Sept. 1	–	Dec. 1	–
10	1	9	1	8	–	8	1
17	1	16	1	15	1	15	4
24	1	23	4	22	6	22	1
31	2	30	–	29	2	29	1
TOTAL	20		21		23		39

TOTAL—103.

TABLE D.—RELATING TO THE CASES OF PUERPERAL FEVER ATTENDED EITHER BY MIDWIVES OR DOCTORS DURING THE YEARS 1905 AND 1906.

No. of cases attended by			Cases proving fatal	No. occurring from January 1st to June 30th		No. occurring from July 1st to Dec. 31st	
				Cases	Deaths	Cases	Deaths
Midwives alone.	1905	41	11	17	7	24	4
	1906	32	6	12	3	20	3
Doctors alone	1905	31	11	21	6	10	5
	1906	54	20	21	8	33	12
Midwife and Doctor	1905	10	3	5	3	5	0
	1906	17	4	8	4	9	0
TOTALS	1905	82	25	43	16	39	9
	1906	103	30	41	15	62	15

TABLE E.—SHOWS WHERE PATIENTS SUFFERING FROM PUERPERAL FEVER WERE TREATED, AND THE RESULTS OBTAINED, IN 1906.

Cases treated at	Total No. of Cases	No. Recovering	No. of Deaths	Case Mortality per cent.
Monsall Hospital*	50	37	13	26·0
Home	43	32	11	25·6
Other Institutions	10	4	6	60·0
Total.....	103	73	30	29·1

* The apparent discrepancy between these figures and those given on page 3 is owing to the fact that the results of the 50 cases have been given whether occurring in 1906 or not.

TABLE F.—SHOWING FOR CASES OF PUERPERAL FEVER THE CHARACTER OF THE LABOUR AND THE RESULTS FOR 1906; ALSO THE CLASSIFICATION OF ABNORMAL CASES, AND CASES IN WHICH PERINEAL TEAR WAS STATED TO BE PRESENT.

	No. of Cases	Recovery	Death
Normal full term labour	57	45	12
Abnormal full term labour.....	38	22	16
Abortion	8	6	2
Abnormal Labour.			
Forceps	16	11	5
Adherent placenta manual removal	9	5	4
Placenta prævia	4	2	2
Retained placenta (not removed)	3	1	2
Ante and post partum hæmorrhage	2	1	1
Craniotomy	2	1	1
Precipitate labour	2	1	1
Perineal tear stated to be present.			
Labour normal	14	14	..
Abnormal	11	9	2

TABLE G.—GIVING THE PARITY OF WOMEN ATTACKED.

	No. of Cases	Recovery	Death
I. para.....	34	26	8
II. para.....	17	13	4
III. para.....	11	6	5
IV. para.....	9	7	2
V. para.....	4	3	1
VI. para.....	9	6	3
VII. para.....	1	1	..
VIII. para.....	4	2	2
IX. para.....	3	3	..
X. para.....	6	3	3
XI. para.....	5	3	2
Total	103	73	30

RECORDS OF CALLING-IN MEDICAL AID UNDER RULE E 19 OF THE CENTRAL MIDWIVES' BOARD, AND PAYMENT OF FEES IN CONNECTION THEREWITH.

During the year 1906, the number of medical records received was 1,255, as compared with 769 in the previous year. 951 of the records were for cases occurring in the private practice of midwives, whilst 304 were in connection with the various lying-in charities. The corresponding figures for 1905 were 577 and 192 respectively. Based on the total number of cases attended, this is equal to an increase of 3·8 per cent. The increase was largely in the "labour" group of emergencies requiring medical aid. From these facts it would appear that the midwives are realising the importance of the above-mentioned Rule.

The records are classified in the following table under the various causes for which medical aid was sought.

BLE H.—NUMBER OF CASES OCCURRING IN 1906 IN WHICH THE MIDWIFE ADVISED THAT A REGISTERED MEDICAL PRACTITIONER SHOULD BE SENT FOR (RULE E 18). ALSO THE NUMBER OF APPLICATIONS FROM MEDICAL PRACTITIONERS FOR PAYMENT OF THEIR FEES FOR ATTENDING CERTAIN EMERGENCY CASES.

Medical aid called in on account of the following causes, as stated by the Midwife			Total	Private Cases	Hospital outdoor cases	Jan. to June		July to Dec.		Application for Fees*
						Private	Hospital	Private	Hospital	
Abortions, miscarriages			17	15	2	6	2	9	..	1
Deformed pelvis			..	..	..	..	..	..	..	..
Loss of blood			9	7	2	2	2	5	..	2
Other unusual features of pregnancy			20	17	3	7	1	10	2	1
Presentations	Head	Occipito posterior	17	16	1	3	..	13	1	6
		Brow	8	4	4	4	1	..	3	..
		Face	20	17	3	8	2	9	1	..
		Abnormal	6	5	1	3	1	2	..	..
	Breech	In primiparæ	8	6	2	3	1	3	1	2
		In multipara	2	2	..	2	..	..	..	..
		para not stated	33	26	7	11	3	15	4	2
	Knee		1	1	..	..	..	1	..	..
	Foot		13	11	2	6	..	5	2	..
	Hand or arm		8	6	2	1	1	5	1	4
	Transverse		22	10	12	6	12	4	..	1
	Funis		28	16	12	3	6	13	6	4
	Placenta Prævia		17	15	2	6	1	9	1	1
	Unable to make out		2	1	1	1	1	..	..	1
Tedious labour	Forceps used		28	27	1	14	1	13	..	35
	No record as to forceps		249	211	38	89	15	122	23	7
Placenta	Retained		45	37	8	21	2	16	6	8
	Adherent		26	21	5	10	4	11	1	7
Membranes retained			32	19	13	10	10	9	3	2
Rupture of perineum			124	93	31	45	21	48	10	6
Tear into rectum			..	..	..	..	..	..	..	1
Flooding or convulsions			70	53	17	24	9	29	8	5
Abdominal swellings			..	..	..	..	..	..	..	..
Foul-smelling discharges			5	4	1	2	..	2	1	..
Post partum hæmorrhage			6	4	2	2	2	2	..	4
Rigor			7	7	..	4	..	3	..	..
Rise of temperature above 100·4° F.			83	42	41	19	24	23	17	6
Unusual swelling of breasts			14	8	6	6	3	2	3	..
Progress unsatisfactory or complications			81	52	29	26	13	26	16	3
Injuries received during birth			2	2	..	..	..	2	..	..
Obvious malformations			30	19	11	4	4	15	7	..
Concealed malformations			2	2	..	1	..	1	..	..
Inflammation of eyes, eyelids, and ears			15	4	11	2	5	2	6	..
Syphilitic appearance of skin			..	..	..	..	..	..	..	..
Illness from prematurity			73	56	17	22	8	34	9	..
Malignant jaundice			23	23	..	10	..	13	..	..
Inflammation about the umbilicus			1	..	1	..	1	..	..	..
Unspecified or complications			108	92	16	36	7	56	9	4
TOTALS			1255	951	304	419	163	532	141	113

* The first application for a fee was received on July 7th, 1906.

Enquiries were only made into special cases where the medical practitioner had been called in because of rise of temperature, quickened pulse rate, rigor, foul-smelling discharge, or other symptoms of Puerperal Fever. Visits were also made in some cases where inflammation of the child's eyes was reported. Sixty records were thus dealt with. In 25 of these cases the mother was subsequently notified as suffering from Puerperal Fever.

Particulars of the arrangements made for the payment of fees to medical practitioners were given in the report for 1905. 113 applications were received and considered in 1906 by the Medical Sub-Committee, and out of this number 35 were rejected as not fulfilling the conditions. The sum paid in fees for the six months was £81 2s.

Still-births.

(A)—*Still-births occurring in the practice of Doctors and Midwives as ascertained from the Cemetery Returns.*

The total number of still-births during 1906, of which there is any return, was 789.

This number includes 449 still-births which occurred in the practice of doctors, and 340 which occurred in the practice of midwives.

Through the courtesy of the Parks and Cemeteries Committee, and of Registrars of Cemeteries in Manchester not under their management, the Midwives' Supervising Committee receives a list of all still-births registered. Midwives are required by law to notify all still-births occurring in their practice within 24 hours.

A fairly complete return is therefore for the first time available.

Through the Cemeteries' return, 658 still-births were notified; 449 of these were doctors' cases, and 209 midwives' cases. 131 still-births attended by midwives were notified by them alone in addition to the 209 cases returned by the cemeteries, and also notified by them. This shows that the Cemeteries' return is not a complete one, and that burials must take place in cemeteries from which there is no return.

It is probable that the actual number of still-births occurring annually in Manchester is close upon 1,000.

The still-births have been classified in districts, those occurring in the practice of doctors and midwives are shown in separate columns.

This classification shows the percentage of live and still-born children, and the still-birth-rate. The still-birth-rate is calculated on the returns from midwives, as these returns are very complete.

It will be seen that the percentage of still-born children is in Manchester 3·5, and the still-birth-rate 0·53 per 1,000 of the population in midwives' practice.

The districts in which the still-birth-rate is highest are those of Bradford, Hulme, Beswick, Ancoats, St. George's, and Central. These are given in order, beginning with the district in which the still-birth-rate is highest.

In the first four districts, the birth-rate is also the highest in Manchester, and in all the districts there is a high infantile mortality rate.

TABLE I.—TOTAL NUMBER OF BIRTHS REGISTERED IN 1906; ALSO THE NUMBER OF STILL-BIRTHS OCCURRING IN THE PRACTICE OF MEDICAL PRACTITIONERS AND MIDWIVES, AS OBTAINED FROM THE RETURNS OF BURIALS AT VARIOUS CEMETERIES.

Statistical Divisions		Births Registered	Still-births Classified from Cemetery Returns		Proportion Per Cent.			Total Still-births notified by Midwives	Still-birth rate per 1,000 of the Population
			Doctors' Cases	Midwives' Cases	Born Living	Still-born			
						Doctors' Cases	Midwives' Cases		
City of Manchester		**18,397**	**449**	**209**	**96·5**	**2·4**	**1·1**	**340**	**0·53**
I. Manchester Township		4,122	112	65	95·9	2·6	1·5	89	0·70
II. North Manchester		5,357	132	46	96·8	2·4	0·8	92	0·49
III. South Manchester		8,918	205	98	96·7	2·2	1·1	159	0·49
I.	Ancoats	1,531	49	25	95·3	3·1	1·6	34	0·78
	Central	746	12	10	97·1	1·6	1·3	16	0·61
	St. George's	1,845	51	30	95·8	2·6	1·6	39	0·67
II.	Cheetham	1,172	20	1	98·2	1·7	0·1	14	0·34
	Crumpsall	193	7	..	96·5	3·5	..	..	..
	Blackley	284	7	..	97·6	2·4	..	3	0·31
	Harpurhey	499	14	3	96·7	2·7	0·6	8	0·38
	Moston	453	4	..	99·1	0·9	..	5	0·28
	Newton	1,084	33	12	96·0	2·9	1·1	21	0·55
	Bradford	897	29	19	94·9	3·1	2·0	26	1·04
	Beswick	435	14	10	94·8	3·0	2·2	12	0·97
	Clayton	340	4	1	98·5	1·2	0·3	3	0·24
III.	Ardwick	1,355	32	19	96·3	2·3	1·4	21	0·47
	Openshaw	941	21	9	97·0	2·1	0·9	13	0·45
	West Gorton	900	10	4	98·5	1·1	0·4	18	0·57
	Rusholme and Kirkmanshulme	803	11	3	98·3	1·3	0·4	10	0·38
	Chorlton-upon-Medlock	1,313	37	15	96·2	2·7	1·1	20	0·35
	Hulme	2,230	49	39	96·2	2·1	1·7	66	1·03
	Moss Side	604	15	3	97·1	2·4	0·5	5	0·18
	Withington	772	30	6	95·6	3·7	0·7	6	0·14

(B)—*Still-births occurring in the Practice of Midwives.*

Those returned during 1905 and 1906 are classified in the accompanying table. From the return for 1906, which is the more complete one, it will be noted that the percentage of still-births occurring in the practice of midwives is 3·06, and that of these slightly more than half are full-term infants. From the returns for both years it will be seen that the percentage of full-term still-born children in the practice of untrained midwives is slightly higher than it is in the practice of trained women.

TABLE J.—PARTICULARS OF STILL-BIRTHS OCCURRING IN THE PRACTICE OF MIDWC DURING 1905–1906, GIVING THE NUMBERS AND PERCENTAGE OF ALL STILL-BIR AND OF FULL-TIME STILL-BORN INFANTS.

Qualification of Midwife		Bona fide	St. Mary's (Manchester)	Manchester Maternity	London Obs. Society	Queen Charlotte	Liverpool Lying-in	Rotunda	Central Midwives Board	Total
Total No. of labours attended by Midwives	1905	2780	3082	2047	2099	72	150	3	..	1020
	1906	3208	3214	2006	2239	85	189	13	175	111
Total No. of still-births	1905	81	73	45	63	..	1	..	..	2(
	1906	94	83	75	76	1	7	..	4	3
Per. cent. of still-births	1905	2·91	2·37	2·20	3·00	..	0·66	..	..	2
	1906	2·93	2·58	3·74	3·40	1·18	3·71	..	2·29	3
No. of full-time still-born children	1905	37	43	24	32	..	1	..	..	1
	1906	57	36	41	40	..	2	..	..	1
Per cent. of full-time still-born children	1905	1·33	1·39	1·17	1·52	..	0·67	..	..	1
	1906	1·78	1·12	2·04	1·79	..	1·06	..	..	1

The number of still-births occurring in the practice of each midwife has been calculated.

Thirty-two have had a higher percentage than 3·5.

Four women who have conducted during the year less than 50 cases have had from 9 per cent. to 16 per cent. of still-births.

On the other hand, the number of still-births in the practice of some of the others has been remarkably low.

The returns from the midwives for 1905 and 1906, and the Cemeteries' return for 1906, show a very marked increase in the number of still-born children, both full-term and premature, in the second and third quarters of the year. It is, however, probable that such an increase was only occasional, as an investigation into the seasonal occurrences of premature deaths—which are closely allied in causation to still-births—for the last 13 years does not bear this out.

The average of the premature deaths for the last 13 years, arranged in seasons, is :—

1st quarter	87
2nd „	82
3rd „	81
4th „	81

It has been impossible throughout the year to carry out any systematic investigation into still-births occurring in the practice of midwives. This is much to be regretted. It is only by such investigation that prevention of registration of new-born children as still-born is possible.

Knowledge of the prenatal conditions of the life of the child is also much needed. Attention in the infantile mortality problem has been too much concentrated both as regards causation and remedies on the postnatal period of the child's life. A systematic inquiry into all still-births and deaths of premature children is essential to acquire the necessary information for a solution of the problem of infantile mortality. The material is now at hand for such an inquiry, which would, without doubt, yield good practical results.

Quite apart from the question of the utility of such an inquiry with regard to the question of still-births, it affords, as was proved in 1905, an excellent mode of investigating a midwife's mode of practice. Certainly all cases (of which there were ten last year) where the Cemeteries' return shows the case to have been a midwife's, and which are not notified by her, should be investigated, and similarly all cases of still-births notified by midwives of which there is no return from the cemeteries.

The still-births occurring in the practice of those midwives who have a high still-birth-rate should also be investigated.

Special Investigation into Still-births.

A special investigation into still-births occurring in the practice of midwives was carried out from June, 1905, to April, 1906, inclusive, and again in July, 1906. In all, 161 cases were thus investigated.

During 1905, ninety-one cases were investigated, and during 1906 seventy. In many cases the children were actually seen. This, however, was sometimes impossible. In all cases, with one or two exceptions, the inquiry was carried out in the house of the patient, and the information was obtained from the patient herself, and where necessary from the midwife. In the following table the sex of the child is given, and a classification of the cases according to whether death was ante-natal or intra-natal :—

	No. of Cases	Sex of Child		Death during Ante-natal Period				Death during Intra-natal Period			
				Certain		Doubtful		Certain		Doubtful	
		M.	F.	Full Term	Prema-ture	Full Term	Prema-ture	Full Term	Prema-ture	Full Term	Prema-ture
1905.....	91	48	43	14	25	2	2	24	2	14	8
1906.....	70	42	28	10	27	...	...	11	. .	13	9
Total.....	161	90	71	24	52	2	2	35	2	27	17

In all except four cases, entered under "Death during the ante-natal period," a distinct history of decomposition of the child at the time of birth was obtained. These four cases were almost certainly ante-natal deaths, but have been classified separately. It was considered best to classify all cases about which there was any doubt whatever as to the time of death under a special column in "Death during the intra-natal period."

The number of premature ante-natal still-births is, as would be expected, much larger than those of full term.

The cause of death in the preventable still-born children—viz., those shown in the column under "Certain deaths during the intra-natal period"—is as follows :—

Vertex Presentation :—13.

Tedious Labour	Cord round neck	Funis Presenting	Hydrocephalus	Hæmorrhage Antepartum	Twin
2	6	1	1	2	1

Breech Presentation :—20.

Uncomplicated Breech	Cord round body and breech	Delayed after coming head	Footling
2	1	13	4

Transverse Presentation :—1.

The large proportion of deaths occurring in breech cases is noteworthy, and especially those cases where death was due to delay of the after coming head. In some of these latter cases the midwife was not called in time to give assistance; in others, medical assistance was not sent for soon enough, or did not arrive in time to save the life of the child. The proportion under this heading is too high.

Deformity of the child was present in 8 cases investigated, these all occurred during 1905.

Hydrocephalus was present in four cases :—

(*a*) With adherent placenta.

(*b*) With spina bifida.

(*c*) In this case the two previous children were still-born.

Anencephalus was present in three cases :—

(*a*) A twin, the other twin was well developed.

(*b*) Spina bifida and hydramnios was also present.

(*c*) Spina bifida also present. The mother was mentally deficient.

Enomphalos with spina bifida was present in one case. In this case there was no abdominal wall, and the viscera were protruding; there was a spina bifida in the dorsal lumbar and sacral regions; the lower limbs were badly developed.

Dropsy of the fœtus was present in one case.

Alcoholism of the Parents.

Both parents had beer or spirits daily in	28	cases.
Either parent had beer or spirits daily in	29	,,
Both parents had beer or spirits occasionally in ..	40	,,
Either parent had beer or spirits occasionally in ..	25	,,
Both parents were abstainers in	33	,,
No history was obtainable in	6	,,
	161	

Occupation of the Mother during Pregnancy.

The mother was definitely occupied for a varying period during pregnancy at other work than that involved in keeping her own house in 44 cases. In 10 cases the woman was at work right up to the day of labour. In the other cases the period was a varying one.

Some were employed in mills or factories, but most were at unorganised work, such as charing, rag picking, etc.

Work was done in most cases to avoid starvation. The wages of the husband were small, or he was out of work. In married primiparae, who worked, the reason was that they became pregnant while unmarried, and required to earn money to furnish their new home.

There were 25 premature children among those engaged in work, and 19 full term.

The overcrowding in the houses investigated was not marked. There was marked poverty in many cases.

Interesting family histories are those of cases Nos. 237 and 197, where all the children by the first husband were born alive, and those by the second were all still-born.

In one case (No. 263) the woman was married 15 years. During this time she was pregnant 15 times. She had 6 abortions, 5 still-births, and 4 full-term living children.

Death of Mother or New-born Child.

No death of a mother has occurred before the attendance of a medical practitioner.

Notifications of 35 deaths of new-born children have been received, and of these 22 were investigated.

Inquests were held by the City Coroner in 19 of these cases, and in one instance the midwife was censured for neglecting to properly tie the umbilical cord (see page 27, No. 4). In two of the cases the midwives were summoned to appear before the Midwives' Supervising Committee, and were warned as to their conduct.

These deaths occurred in the following districts :—St. George's, 6 ; Openshaw, 5 ; Ancoats, 4 ; Harpurhey, Newton, Ardwick, and Hulme, 3 each ; Central, Clayton, and Chorlton-upon-Medlock, 2 each ; and 1 in Cheetham.

Midwives Reported to the Central Midwives' Board on Charges of Malpractice, Negligence, or Misconduct.

During the year the Midwives' Supervising Committee, in considering the various reports submitted to them, decided that *primâ facie* cases of negligence or misconduct had been established against six midwives, and reports respecting these were forwarded to the Central Midwives' Board.

The following are the charges on which such action was based :—

1. Midwife A. (qualification, St. Mary's Hospital) left an uncertified substitute in charge of a case of labour in contravention of Section 1 (4) of the Midwives' Act. Antiseptic precautions had not been observed. Puerperal Fever ensued. The Central Midwives' Board decided to take no action on the first charge, and warned the midwife in regard to the latter.

2. Midwife B. (*bona fide*) was suspended on April 12th, 1905, for not possessing the necessary appliances. This suspension was never removed, but on December 4th, 1905, she was found intoxicated while in attendance on a woman about to be confined. She had examined the woman without carrying out any disinfection, and had not the required appliances or disinfectants. The Central Midwives' Board struck her name off the Midwives' Roll.

3. Midwife C. (London Obs. Society qualification) failed to advise calling in medical aid for raised temperature continuing two days, and for perineal laceration. Cleansing and antiseptic precautions were not carried out. An enema syringe was used as a douche for three days which had been used on a preceding day for giving an enema. No intervening disinfection had taken place. Puerperal Fever ensued. The midwife was censured severely.

4. Midwife D. (*bona fide*) was reported in connection with the death of a new-born child. Death was due to hæmorrhage owing to slack ligatures applied by the midwife. Her knowledge of the rules was unsatisfactory, and her registers were not entered up. The Central Midwives' Board censured the midwife severely on the first charge, and requested the Midwives' Supervising Committee to report after three months as to whether the rules of the Board were being observed. This report was favourable.

5. Midwife E. (qualification, St. Mary's Hospital) failed to advise calling in medical aid for a patient with severe abdominal pain and tenderness, and foul-smelling lochia continuing two days. The patient had been examined without any cleansing or disinfection being carried out. The midwife's bag and appliances were unsatisfactory. She was also not conversant with the rules regarding the use of antiseptics and calling in

medical aid. She was severely censured and cautioned as to strict compliance with the rules. A further report in three months was requested, but the midwife, who resided outside the City, notified her intention of giving up practice in Manchester. Copies of the reports were sent to the authorities of the district in which she lived.

6. Midwife F. (qualification, Manchester Maternity Hospital) did not visit a case on each of the first three days after delivery, and did not advise calling in medical aid for secondary post partum hæmorrhage, rigor, and condition of serious illness of the patient. Puerperal Fever ensued. The midwife was severely censured, and a further report was requested in three months. This was favourable.

In connection with cases 2, 4, and 6, the Executive Officer attended before the Central Midwives' Board in London at their request.

General Remarks.

There was a marked improvement in every department of work, and the midwives showed a much greater willingness to carry out the new regulations.

Many women, who at first through ignorance adopted a hostile attitude, are now quite ready to fulfil the requirements. Others, who were apparently incapable of adapting themselves to the new conditions, have striven to the best of their ability to overcome the difficulties, and have succeeded beyond expectation. There are, however, still a number who are not carrying out the requirements of the rules of the Central Midwives' Board. These women are not acting in ignorance. They have determined to take their chance of detection and punishment. It is only a question of time before this will happen.

During the year many of the midwives were found to be unsatisfactory. Seven were far too old, and three too deaf for the work. Two, though young, were too slovenly. The remainder were unsatisfactory for various other reasons. About 20 others were incapable of much further improvement, although the standard of their work was only medium. Thirty showed a marked improvement in all branches of their work. Two of these women lapsed, however, during the year.

Those midwives who during 1905 did such excellent work have maintained the same high standard.

During the year two midwives resigned voluntarily. One gave up because she was too old, and the other (a widow) married again.

Several young trained women have, however, commenced work, and there is no reason to think that in Manchester there will be inadequate provision for nursing the lying-in women of the working classes.

The majority of the midwives are married women varying in age from 30 to 50. Many devote their whole time to nursing, acting chiefly as midwives or monthly nurses. Others only undertake a small number of cases. They generally do some of the household work in their homes. The amount varies according to the size of their practice.

The attitude of the midwives towards the conditions required by the Act of 1902 is decidedly a more friendly one. They are beginning to realise the benefits resulting therefrom, and feel the inspection less irksome.

One woman, a *bona fide* midwife, who is now doing good work, stated that the Act had been a great boon to her. She formerly adopted bad methods through ignorance. Her patients now recover much better, and cause her less anxiety. They also make better preparation for the labour, providing more clean clothes, etc. Others working in different districts have corroborated this.

Borderland Midwives.

It is necessary that the work done in each district should be supervised by the Local Supervising Authority of that district, whether the midwife resides within or without. Unless this is done the work of borderland midwives will be allowed a degree of laxity not permitted to those who reside and practice wholly in any one district. It is easy, without much dislocation of work, for a midwife who has her practice in a populous boundary district to move across the border if she thinks the supervision exerted in one area too strict.

Registration of the name and address of the attendants at the birth is much needed to check evasion in borderland work.

Addresses to Midwives.

It was felt that the midwives were now in a position to profit by instruction in the requirements of the rules given to them in small classes. It was also felt that if they chose to avail themselves of such an opportunity, the instruction given could be more detailed and extensive than was possible when paying one inspection visit.

The accompanying syllabus of the work was submitted to the Midwives' Supervising Committee at their meeting on July 12th, 1906, and permission was granted to begin the instruction as soon as possible.

It was not possible to do so during 1906, but for the last six months classes have been held weekly on Wednesday afternoons.

The addresses have been very informal, and are practical demonstrations in the requirements regarding cleansing and antiseptic precautions, and in the use of required appliances. They have been on the whole very well attended.

Midwives were circularised that such demonstrations would take place, and asked to notify whether they wished to attend. Those who wished to attend were further circularised when the set of demonstrations arranged for them began.

Six demonstrations were given in each set. A varying number of midwives, from 20 to 30, were asked to come.

Address No. 1.

General duties:

Appliances demonstrated .. .. Rule 2
Method of cleansing, and disinfection of appliances and bag .. ,, 4

Clothing:

Dresses and aprons. Washing sleeves which roll up .. .. ,, 1
Other clothing. General. Gloves. Cloaks.

Cleanliness. General. Bath in house .. .. ,, 1
Hands and nails. Care of same.

Precautions *re* appliances, clothing, hands, etc.:

(*a*) After normal confinement and puerperial visit.. .. .. ,, 1
(*b*) After case with foul-smelling discharge—suspicious .. .. ,, 1
(*c*) After case of Puerperal Fever .. .. ,, 5

Explanation why these rules are necessary. Germs—necessity for killing these. Difficulty of doing so.

Notifications to be sent in to the Local Authority:

Deaths. Mother. Child. Action .. .. ,, 18 (1)
Still-births. Action .. .. ,, 18 (2)
Puerperal Fever and other infectious diseases.. .. .. .. ,, 18 (3)
Medical records .. .. ,, 19b

Registers:

Register of cases.
Temperature register.
Practical instructions given in book-keeping required.
Midwives to bring their own bag of appliances, and to wear the uniform worn while attending confinements.

Address No. 2.

Duties to patient:

Before labour—procedure when patient comes to engage midwife .. .. Rule 17a
(Special instructions to be given aterl.)

During labour—a normal case:

Demonstration of presentation with dummy .. .. .. ,, 12, 17b

Person of patient, preparation of .. .. Rule 7
Midwife's hands and arms, preparation of, with practical demonstration .. .. ,, 3
Few examinations to be made .. .. ,, 8
Bed, preparation of, with practical demonstration .. .. ,, 10

Attendance constant after onset of second stage .. .. .. ,, 6

Abnormal cases defined, demonstration of presentation with dummy .. .. ,, 17b

Procedure and preparation as in normal .. .. ,, 7, 3, 8, 10, 6.

And advising that medical aid be sent for—written message .. ,, 19b, 17b

Action while waiting for doctor .. .. ,, 6

Action if relatives refuse to call in doctor .. .. ,, 17

Drugs .. .. ,, 16

Address No. 3.

Duties to patient:
After labour—immediate care .. .. ,, 10
During lying-in period—length—normal—abnormal .. .. ,, 11
Cleanliness and comfort. Patient—care of—clothing .. .. ,, 11
(Special instructions later.)
Daily routine, pulse, temperature—practical instruction and method of taking same .. .. ,, 17c
When to advise calling in medical aid .. .. ,, 17c
Action if relatives refuse .. .. ,, 17
Puerperal sepsis. Signs and symptoms .. .. ,, 17c, I. (1, 2, 3, 4, 5)
Precautions required. Danger of mild cases .. .. .. Rule 5

Address No. 4.

Duties to child:
During birth. Eyes .. .. Rule 14
After birth. Immediate danger to life; procedure to adopt ,, 9
Separation of cord. Demonstration .. ..
Artificial respiration. Demonstration .. .. ,, 13
Cleanliness and comfort. Precautions required .. .. .. ,, 11
Abnormalities. Illnesses .. .. ,, 17c
Medical aid to be advised .. .. ,, 17c
Proper dieting, influence of .. .. ,, 17c
Breast feeding, importance of. Method.. .. ..
Bottle feeding, dangers of. Demonstration of method of preparing food .. ..

Artificial foods, dangers of. Starvation brands of condensed milk .. ..

Safest brands to use.

Information to be given regarding feeding of child after first ten days.

Distribution of printed slips .. ..

Information to be given regarding influence of dirt. Summer Diarrhœa.

What is a still-birth ? .. .. Rule 18, (2)

Address No. 5.

Special duties to the patient :

During pregnancy .. .. „ 17a

Importance of personal interview.

Instruction to be given to healthy women *re* diet, drinks (danger of alcohol), clothing, exercise, rest, fresh air, care of bowels, skin and kidneys, care of breasts, special development of nipples.

Preparations for the labour. Clothes for mother, child, and bed. Value of maternity bag in which to collect boiled old linen.

When to seek medical advice. Importance of having urine tested.

During the puerperium .. .. „ 11

General care to be taken (Address 3).

Instruction to be given *re* diet (avoidance of alcohol), clothing, personal toilet, cleansing of breasts and nipples.

Measure to adopt to relieve distended breasts.

Care of cracked nipples.

During lactation :

Instruction *re* diet, and general hygiene of mother and child.

How to feed the child. When to wean.

How to avoid Summer Diarrhœa.

On behalf of the Special Committee,

A. W. Chapman,

Chairman.

Town Hall, Manchester,

25th July, 1907.

TABLES.

TABLE A.—MANCHESTER, 1906.

Causes of Death at Different Life Periods in the 52 weeks of the Yi

PERSONS.—(MALES AND FEMALES.)

CAUSES OF DEATH	Ages at Death												
	All Ages	Under 5 Years		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85
		0 to 1	1 to 5										
All Causes	12111	3111	1726	289	180	209	236	749	993	1200	1369	1298	621
A.—General Diseases	5126	1665	1060	155	84	116	138	360	447	463	350	217	63
B.—Local Diseases	5632	859	564	102	82	86	90	345	494	675	941	921	393
C.—Other Specified Dis.	8	3	...	2	...	1	...	...	...	...	...	2	...
D.—Ill-defined Diseases	884	491	38	1	1	1	...	1	2	2	29	133	148
E.—Violent Deaths	461	93	64	29	13	5	8	43	50	60	49	25	17
A.—General Diseases.													
Smallpox.. Vaccinated	...	...	...	...	...	...	...	...	...	...	...	...	...
Smallpox.. Not Vaccinated	...	...	...	...	...	...	...	...	...	...	...	...	...
Smallpox.. No Statement	...	...	...	...	...	...	...	...	...	...	...	...	...
Cowpox	...	...	...	...	...	...	...	...	...	...	...	...	...
Chickenpox	...	...	...	...	...	...	...	...	...	...	...	...	...
Measles	475	110	348	17	...	...	...	...	...	...	...	...	...
Epidemic Rose Rash	1	...	1	...	...	...	...	...	...	...	...	...	...
Scarlet Fever..	108	1	62	29	11	2	1	2	...	...	...	...	...
Typhus	...	...	...	...	...	...	...	...	...	...	...	...	...
Plague	...	...	...	...	...	...	...	...	...	...	...	...	...
Relapsing Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Influenza	90	1	2	...	3	2	4	8	7	13	18	24	5
Whooping Cough	193	78	109	6	...	...	...	...	...	...	...	...	...
Mumps	1	...	1	...	...	...	...	...	...	...	...	...	...
Diphtheria and Memb: Croup	119	13	69	27	3	2	...	3	1	1	...	...	...
Cerebro-spinal Fever	1	...	...	...	...	1	...	...	...	...	...	...	...
Simple Cont: Fever	2	...	...	...	...	...	...	...	...	1	1	...	...
Enteric Fever	83	...	1	3	7	4	16	27	13	9	2	1	...
Asiatic Cholera	...	...	...	...	...	...	...	...	...	...	...	...	...
Epidemic Diarrhœa	856	647	194	1	...	...	1	...	2	1	4	5	1
Diarrhœa	123	86	22	...	1	...	...	...	1	...	4	6	3
Dysentery	2	...	...	...	...	...	...	...	...	2	...	...	...
Malarial Fever	1	...	...	...	...	...	...	...	...	...	1	...	...
Hydrophobia	...	...	...	...	...	...	...	...	...	...	...	...	...
Glanders	...	...	...	...	...	...	...	...	...	...	...	...	...
Anthrax	...	...	...	...	...	...	...	...	...	...	...	...	...
Tetanus	...	...	...	...	...	...	...	...	...	...	...	...	...
Syphilis	41	38	1	...	...	...	...	...	1	1	...	...	...
Gonorrhœa, Strict: Urethra	11	...	...	...	...	...	...	...	2	2	3	...	2
Puerperal.. Septicæmia	22	...	...	...	...	...	5	13	4	...	...	...	...
Puerperal.. Pyæmia	1	...	...	...	...	...	...	...	1	...	...	...	...
Puerperal.. Phlegmasia Dol:		...	...	...	...	...	...	...	...	...	...	...	...
Puerperal.. *Fever*	7	...	...	...	...	...	...	2	5	...	...	...	...
Infective Endocarditis	10	...	...	...	3	1	2	2	2	...	...	...	...
Epidemic Pneumonia / Pneumonic Fever	3	...	...	...	...	...	...	...	1	2	...	...	...
Erysipelas	23	5	...	...	...	...	1	1	2	6	2	5	1
Septicæmia (not puerp:)	11	1	1	...	1	1	1	1	1	3	...	...	1
Pyæmia (not puerp:)	5	...	3	1	...	...	...	1	...	...	...	...	...
Phlegmon	...	...	...	...	...	...	...	...	...	...	...	...	...
Phagedœna	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Septic Diseases	6	1	...	...	...	2	...	...	2	1	...	...	...
Tubercular Phthisis	1052	4	19	13	21	77	83	229	263	216	94	29	4
Phthisis	37	...	...	...	...	...	3	9	7	12	5	...	1

TABLE A, 1906—*continued.*

CAUSES OF DEATH	Ages at Death													
	All Ages	Under 5 Years		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
A.—General Diseases— *continued*														
Tubercular Meningitis	192	53	94	32	5	4	1	1	1	1	...	...	...	...
Tubercular Peritonitis	69	29	23	5	3	3	...	2	2	1	1	...	...	...
Tabes Mesenterica	21	8	11	1	...	...	...	1	...	...	...	...	...	...
Lupus	4	...	...	...	...	1	...	1	...	...	1	1	...	...
Tubercle of other organs	40	1	8	3	6	2	3	4	4	5	1	2	1	...
General Tuberculosis	77	14	27	8	8	1	2	5	5	1	5	1	...	...
Scrofula	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Parasitic Diseases	1	...	...	...	...	1	...	...	...	...	...	...	...	...
Starvation	1	...	...	...	...	...	...	...	...	...	...	1	...	...
Scurvy	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Alcoholism, Delirium Tremens	68	...	...	...	...	...	1	9	26	17	9	6	...	...
Opium, Morphia Habit	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ptomaine Poisoning	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Industrial Poisoning — Lead	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Industrial Poisoning — Phosphorus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Industrial Poisoning — Arsenic, &c.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rheum: Fever, Acute Rheum:	37	...	1	5	6	5	4	2	4	5	2	3	...	...
Rheumatism of Heart	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Chronic Rheumatism	34	...	...	2	...	...	...	1	2	3	9	12	5	...
Rheum: Arthritis, Rheum: Gout	4	...	...	...	...	...	...	...	...	...	1	2	1	...
Gout	5	...	...	...	...	...	...	...	...	...	1	3	...	1
Carcinoma	477	...	...	...	...	...	1	14	64	127	143	92	34	2
Sarcoma	48	...	3	...	2	4	2	7	8	10	5	5	2	...
"*Cancer*," Malignant Disease	37	...	...	...	...	...	...	1	5	5	16	9	1	...
Rickets	49	18	31	...	...	...	...	...	...	...	...	...	...	...
Purpura	4	...	...	...	1	...	1	...	...	1	...	1	...	...
Hæmophilia, Hæm: Diathesis	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Anæmia, Leucocythæmia	34	2	1	2	1	...	2	4	5	11	5	1	...	..
Diabetes Mellitus	54	...	1	...	1	2	4	9	5	6	17	8	1	..
Premature Birth	406	406	...	...	...	...	...	...	...	...	...	...	...	..
Congenital Defects	85	79	4	...	1	1	...	...	...	...	...	...	...	..
Injury at Birth	7	7	...	...	...	...	...	...	...	...	...	...	...	..
Atelectasis	23	23	...	...	...	...	...	...	...	...	...	...	...	...
Want of Breast Milk	16	16	...	...	...	...	...	...	...	...	...	...	...	..
Teething	46	23	23	...	...	...	...	...	...	...	...	...	...	...
B.—Local Diseases.														
1.-Nervous System.														
Inflammation of Brain	137	45	57	9	10	...	5	2	3	3	1	1	1	...
Softening of Brain	22	...	...	...	...	...	...	...	1	6	6	8	1	...
General Paraly: of Insane	63	...	...	...	...	...	...	10	21	20	6	4	2	...
Insanity (not puerperal)	108	...	1	...	1	1	3	10	23	23	25	14	5	2
Chorea	2	...	...	1	...	...	...	1	...	...	...	...	...	...
Epilepsy	56	...	1	3	4	5	3	11	8	8	4	5	4	...
Convulsions	171	144	22	2	1	...	...	1	...	...	...	1	...	..
Laryngismus Stridulus	11	7	4	...	...	...	...	...	...	...	...	...	...	...
Locomotor Ataxy	8	...	...	...	...	...	...	...	1	2	4	1	...	...
Dis: of Spinal Cord	39	...	1	3	...	3	...	3	10	3	8	6	2	...
Neuritis	16	...	...	...	...	...	...	1	5	6	3	1	...	...
Brain Tumour	18	...	...	2	2	1	...	4	4	2	1	1	...	1
Nervous System (other Dis:)	22	2	1	...	2	...	...	1	3	3	2	5	3	...
2. Diseases of Special Sense Organs.														
Otitis, Mastoid Disease	13	3	...	3	2	2	1	1	...	...	1	...	...	...
Epistaxis, Nose Disease	1	...	...	...	...	...	...	...	...	1	...	...	...	...
Ophthalmia, Eye Disease	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE A, 1906—*continued.*

CAUSES OF DEATH	Ages at Death												
	All Ages	Under 5 Years		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85
		0 to 1	1 to 5										
3. Diseases of Heart.													
Valvular Dis: Endocarditis	295	1	1	9	11	16	8	36	39	46	63	41	21
Pericarditis	8	...	1	1	...	1	1	...	4	...	...	...	...
Hypertrophy of Heart.....	2	...	...	...	...	...	...	...	...	1	...	...	1
Angina Pectoris	24	...	...	...	...	...	...	1	1	1	16	5	...
Dilatation of Heart	122	...	...	...	...	...	1	2	12	34	38	26	6
Fatty Degen: of Heart	24	...	1	...	...	...	...	1	3	6	9	3	1
Syncope, Heart Disease.....	688	7	3	4	7	8	7	29	42	78	157	207	109
4. Dis: of Blood Vessels.													
Cerebral Hæmorrhage.....	408	...	3	...	...	1	4	15	28	59	114	122	51
Apoplexy, Hemiplegia.....	58	...	...	...	...	1	1	1	...	8	17	22	7
Aneurism	21	...	...	...	...	...	...	3	6	4	5	3	...
Senile Gangrene	17	...	...	...	...	...	...	...	...	...	6	4	6
Embolism, Thrombosis	4	...	...	...	...	...	...	1	1	2	...	...	...
Phlebitis.....	4	...	...	...	...	...	...	1	1	1	...	1	...
Varicose Veins	...	...	...	...	...	...	...	...	...	...	...	...	...
Blood Vessels (Other Diseases)	33	...	1	...	...	...	...	2	4	5	10	7	3
5. Dis: of Respiratory Sys:													
Laryngitis	23	1	12	4	1	...	...	...	2	1	1	...	...
Memb: Laryng: (Not Diphth:)	...	...	...	...	...	...	...	...	...	...	...	...	...
Croup	3	...	3	...	...	...	...	...	...	...	...	...	...
Larynx (Other Dis:)	1	...	...	...	...	...	...	...	...	1	...	...	...
Bronchitis	1,011	192	100	6	5	6	4	19	33	111	203	222	92
Pneumonia { Lobar.....	430	28	40	7	8	16	22	63	77	60	54	42	10
Pneumonia { Broncho.....	563	182	220	13	3	3	4	16	21	20	31	37	13
"*Pneumonia*".....	115	9	19	6	2	6	4	15	13	16	10	12	1
Emphysema, Asthma	17	...	...	...	...	...	1	2	...	5	6	3	...
Pleurisy	32	1	1	1	1	...	...	2	6	7	6	4	3
Fibroid Disease of Lung.....	4	...	...	...	...	1	...	...	...	...	2	1	...
Respiratory Dis: (Other)	47	12	4	2	...	1	...	5	3	3	5	5	7
6. Dis: of Digestive Sys:													
Tonsillitis, Quinsy	3	...	...	1	1	...	...	...	1	...	...	...	...
Mouth, Pharynx	20	14	5	..	...	...	1	...	...	...	...	...	...
Gastric Ulcer.....	30	...	...	...	1	3	...	5	9	8	4	...	...
Gastric Catarrh.....	24	14	4	...	...	...	...	...	2	1	1	1	1
Stomach (Other Dis:).....	78	33	15	2	...	...	...	10	5	1	2	7	3
Enteritis.....	78	57	8	2	2	...	...	1	2	2	2	2	...
Gastro-Enteritis.....	70	49	13	1	1	...	...	...	...	3	3	...	...
Appendicitis, Perityph :	24	...	...	3	3	2	4	5	4	1	1	1	...
Hernia	28	...	...	...	...	...	1	...	2	5	7	8	5
Intestinal Obstruct:.....	49	11	3	1	1	1	...	3	6	8	4	9	2
Other Diseases of Intestines ...	24	7	3	1	1	1	...	3	3	2	2	1	...
Peritonitis	26	1	1	3	1	...	3	9	1	2	2	2	1
Cirrhosis of Liver.....	79	...	...	...	...	...	...	...	18	31	22	6	2
Liver and Gall Bladder (O. D.).	37	15	1	1	...	...	...	1	1	3	7	5	3
Digestive System (Other Dis:)...	11	7	...	...	1	...	...	...	...	...	2	...	1
7. Dis: of Lymphatic and Ductless Glands.													
Spleen, Disease of.....	3	1	1	1	...	...	...	...	...	...	...	...	...
Lymphat: Syst: (Other Dis:)...	6	...	...	1	1	...	...	1	1	1	1	...	...
Thyroid Body (Other Dis:) ...	7	1	1	...	...	...	2	...	2	1	...	...	...
Supra Renal Caps: (Dis: of)...	6	...	...	...	...	...	1	...	5	...	...	...	...
8. Diseases of Urinary System.													
Nephritis Ac:, Uræmia	56	1	6	4	4	1	2	8	8	5	8	8	1
Ch: Bright's Dis: Albumin :...	182	...	2	2	3	5	2	18	29	39	43	29	9
Calculus	2	...	...	...	...	...	...	1	...	1	...	...	...
Bladder and Prostate Dis: ...	44	...	1	...	...	...	1	1	...	4	6	19	11
Urinary Syst: (Other Dis:) ...	14	2	...	1	...	...	...	1	3	1	3	1	2

TABLE A, 1906—*concluded.*

CAUSES OF DEATH	Ages at Death													
	All Ages	Under 5 Years		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
9. Diseases of Generative System.														
Ovarian Tumour	3	...	...	...	...	...	2	...	...	...	1	...	...	...
Other Dis : of Ovary	3	...	...	...	...	...	...	...	1	1	1	...	...	...
Uterine Tumour	6	...	...	...	...	...	...	...	4	1	1	...	...	...
Other Dis: of Uterus and Vagina	3	...	...	...	...	...	...	2	...	1	...	...	...	...
Disord : of Menstruation	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gener: and Mam: Orgs: (other)	1	...	...	...	...	...	...	...	...	...	1	...	...	...
10. Diseases of Pregnancy and Childbirth.														
Abortion, Miscarriage	2	...	...	...	...	...	...	2	...	...	...	...	...	...
Puerperal Mania	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Puerperal Convulsions	7	...	...	...	...	...	2	2	3	...	...	...	...	...
Placenta Præv: Flooding	12	...	...	...	...	...	...	6	6	...	...	...	...	...
Other Ac: of Preg: & Childbirth	9	...	...	...	...	...	...	6	2	1	...	...	...	...
11. Diseases of Locomotor System.														
Caries, Necrosis	6	...	2	...	2	...	...	...	...	2	...	...	...	...
Arthritis, Periostitis	2	1	...	...	...	...	...	...	...	1	...	...	...	...
Locomotor Sys : (Other)	7	...	1	1	...	1	...	1	...	2	...	1	...	...
12. Diseases of the Skin.														
Ulcer, Bedsore	10	...	1	...	...	...	...	...	1	1	2	3	1	1
Eczema	3	1	...	...	...	...	...	...	...	...	1	1	...	...
Pemphigus	3	3	...	...	...	...	...	...	...	...	...	...	...	...
Skin Diseases (other)	13	7	...	1	...	...	...	...	...	...	...	3	2	...
C.—Other Specified Diseases	8	3	...	2	...	1	...	...	...	...	...	2	...	...
D.—Ill-defined and not Specified Diseases.														
Atrophy, Debility	581	483	34	1	1	...	...	...	...	2	10	23	24	3
Old Age	286	...	...	...	...	...	...	...	...	...	18	110	124	34
Dropsy, Ascites, Anasarca	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Tumour	3	1	1	...	...	...	...	...	...	...	1	...	...	...
Abscess	8	4	3	...	...	...	...	...	1	...	...	...	...	...
Hæmorrhage	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sudden (cause unascertained)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Ill-defined	5	3	...	...	...	1	...	1	...	...	...	...	...	...
E.—Violent Deaths.														
1. Accident.														
In Mines and Quarries	1	...	...	...	...	...	...	1	...	...	...	...	...	...
By Vehicles { On Railways	5	...	...	...	...	...	...	...	4	...	1	...	...	...
By Vehicles { In Streets	29	...	4	5	2	...	...	4	1	6	5	1	1	...
Ships, Boats, Docks (not Drowning)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Building Operations	2	...	...	...	...	...	...	1	1	...	...	...	...	...
Machinery	8	...	...	...	1	1	1	...	...	3	2	...	...	...
Weapons and Implements	2	...	...	...	...	...	1	1	...	...	...	...	...	...
Burns and Scalds	85	3	48	11	4	1	...	2	6	3	2	...	4	1
Poison, Poisonous Vapours	13	...	2	2	1	...	...	4	1	2	1	...	...	...
Drowning	29	...	2	7	2	...	1	3	3	8	2	1	...	...
Suffocation	93	86	2	...	...	...	...	...	2	1	...	1	1	...
Falls	95	3	4	2	2	...	1	8	11	17	18	16	9	4
Weather Agencies	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Otherwise or not Stated	33	1	2	2	1	2	...	2	8	4	6	4	1	...
2. Homicide.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Suicide.	66	...	...	..	...	1	4	17	13	16	12	2	1	...
4. Execution.	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE B.—MANCHESTER, 1906.

Causes of Deaths at Different Life Periods—MALES.

Classes	CAUSES OF DEATH	All Ages Total	Ages at Death—in years: Under 5 Years 0 to 1	Under 5 Years 1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and
	All Causes	6312	1758	856	140	73	107	107	399	545	681	733	611	249	5
A	Smallpox	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Measles	242	66	169	7	...	...	...	...	...	...	...	...	...	...
	Scarlet Fever	56	...	36	11	5	2	...	2	...	...	...	...	...	...
	Typhus Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Whooping Cough	82	32	47	3	...	...	...	...	...	...	...	...	...	...
	Diphtheria, Memb: Croup	56	7	27	17	1	1	...	1	1	1	...	...	...	...
	Ill-defined Fever	2	...	...	...	...	...	...	...	...	1	1	...	...	...
	Enteric Fever	49	...	...	...	2	2	11	17	9	6	1	1	...	...
	Influenza	43	1	2	...	2	1	...	5	3	7	11	9	1	
	Epidemic Diarrhœa	450	352	92	...	...	...	...	...	1	1	1	3	...	...
	Diarrhœa, Dysen., Simple Chol.	73	52	12	...	...	...	...	...	...	1	1	4	3	...
	Venereal Affections	32	19	1	...	...	...	...	...	3	2	3	...	2	
	Erysipelas	18	5	...	...	...	...	...	1	2	5	1	3	1	...
	Pyæmia, Septicæmia	10	1	2	...	1	2	...	1	...	2	...	...	1	
	Puerperal Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Other Zymotics	11	...	2	...	1	2	1	...	2	2	1	...	...	...
	Tuberc. Periton: Tabes Mes:	42	18	19	2	1	2	...	...	...	...	...	...	...	...
	Tubercular Meningitis	99	30	42	19	2	3	1	1	1	...	...	...	...	...
	Phthisis	684	2	8	5	3	40	39	150	172	168	71	22	4	...
	Tuberculous Dis. (other)	52	3	16	6	5	2	3	4	6	3	3	1	...	...
	Parasitic Diseases	...	...	...	...	..	...	...	...	...	...	...	...	...	...
	Alcoholism	43	...	...	...	...	...	1	6	17	8	7	4	...	...
	Rheumatic Fever	16	...	...	2	3	4	...	1	2	2	...	2	...	...
	Cancer	242	...	...	...	1	3	..	5	23	68	83	47	12	...
	Premature Birth	242	242	...	...	...	...	..	...	...	...	...	...	...	...
	Congenital Defects	49	46	2	...	1	...	...	...	...	...	...	...	...	...
	Epilepsy	28	...	1	1	1	2	1	7	5	2	3	4	1	...
	Convulsions	96	83	9	2	1	...	...	...	...	...	...	1	...	...
	Nervous Syst: (other)	247	35	37	7	8	1	4	16	41	42	31	19	4	1
	Cereb: Haem: Apoplexy, Hemip:	216	...	3	...	...	1	3	9	16	34	59	66	21	4
	Heart and Blood Vessel Dis:	566	6	4	8	6	8	6	30	49	83	160	128	62	16
B and C	Croup	2	...	2	...	...	...	...	...	...	...	...	...	...	...
	Bronchitis	502	106	53	2	2	3	4	9	19	66	106	98	29	5
	Pneumonia	622	127	138	15	3	17	19	57	65	62	58	46	12	3
	Respiratory Dis: (other)	69	9	11	2	1	1	1	8	6	9	11	8	1	1
	Digestive Syst: (other)	283	124	30	7	6	3	2	13	24	22	20	19	13	...
	Urinary Syst: (other)	184	1	4	3	5	2	1	16	27	32	37	37	18	1
	Generative Organs	2	...	...	...	...	...	...	1	...	...	1	...	...	...
	Other specified Diseases	166	52	31	5	3	2	4	10	11	13	16	17	1	1
D	Marasmus and Atrophy	339	290	15	...	...	...	..	...	...	1	4	15	12	2
	Old Age	115	...	...	...	...	...	...	...	...	...	12	45	45	13
	Other Ill-defined Causes	9	4	3	...	...	1	...	1	...	...	...	...	...	...
E	Violence	226	45	38	16	9	2	4	16	29	27	21	12	5	2
	Homicide	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Suicide	47	...	...	...	...	...	2	12	11	11	10	...	1	...

TABLE C.—MANCHESTER, 1906.

Causes of Deaths at Different Life Periods—FEMALES.

Classes	CAUSES OF DEATH	All Ages Total	Ages at Death—in years: Under 5 Years 0 to 1	Under 5 Years 1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
	All Causes	5799	1353	870	149	107	102	129	350	448	519	636	687	372	77
	Smallpox	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Measles	233	44	179	10	...	...	...	...	...	...	...	...	...	...
	Scarlet Fever	52	1	26	18	6	...	1	...	...	...	...	...	...	...
	Typhus Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Whooping Cough	111	46	62	3	...	...	...	...	...	...	...	...	...	...
	Diphtheria, Memb: Croup	63	6	42	10	2	1	...	2	...	...	...	...	...	...
	Ill-defined Fever	...	...	...	...	...	...	...	..	...	...	...	...	...	...
	Enteric Fever	34	...	1	3	5	2	5	10	4	3	1	...	...	...
	Influenza	47	...	...	...	1	1	4	3	4	6	7	15	4	2
	Epidemic Diarrhœa	406	295	102	1	...	...	1	...	1	...	3	2	1	...
	Diarrhœa, Dysentery, Simple Cholera	52	34	10	...	1	...	...	...	1	1	3	2	...	...
	Venereal Affections	20	19	...	...	...	...	...	...	...	1	...	...	...	...
	Erysipelas	5	...	...	...	...	...	1	...	...	1	1	2	...	...
	Pyæmia, Septicæmia	12	1	2	1	...	1	1	1	3	2	...	...	...	...
A	Puerperal Fever	30	...	...	...	...	...	5	15	10	...	...	...	...	...
	Other Zymotics	6	...	...	...	2	...	1	2	1	...	...	...	...	...
	Tubercular Periton : Tabes Mes.	48	19	15	4	2	1	...	3	2	1	1	...	...	...
	Tubercular Meningitis	93	23	52	13	3	1	...	...	...	1	...	...	...	...
	Phthisis	405	2	11	8	18	37	47	88	98	60	28	7	1	...
	Tuberculous Diseases (other)	69	12	19	5	9	2	2	6	3	3	4	3	1	...
	Parasitic Diseases	1	...	...	...	...	1	...	...	...	...	...	...	...	...
	Alcoholism	25	...	...	...	...	...	...	3	9	9	2	2	...	...
	Rheumatic Fever	21	...	1	3	3	1	4	1	2	3	2	1	...	...
	Cancer	320	...	3	...	1	1	3	17	54	74	81	59	25	2
	Premature Birth	164	164	...	...	...	...	...	...	...	...	...	...	...	...
	Congenital defects	59	56	2	...	...	1	...	...	...	...	...	...	...	...
	Epilepsy	28	...	...	2	3	3	2	4	3	6	1	1	3	...
	Convulsions	75	61	13	...	...	...	...	1	...	...	...	...	...	...
	Nervous System (other)	199	19	27	8	7	4	4	16	30	26	25	22	10	1
	Cerebral Hemorrhage, Apoplexy, and Hemiplegia	250	...	...	...	...	1	2	7	12	33	72	78	37	8
	Heart and Blood Vessel Diseases	676	2	3	6	12	17	11	46	64	95	144	169	85	22
B and C	Croup	1	...	1	...	...	...	...	...	...	...	...	...	...	...
	Bronchitis	509	86	47	4	3	3	...	10	14	45	97	124	63	13
	Pneumonia	486	92	141	11	10	8	11	37	46	34	37	45	12	2
	Respiratory Diseases (other)	55	5	6	5	1	1	...	1	5	8	9	5	9	...
	Digestive System (other)	298	84	23	8	6	4	7	24	30	45	39	23	5	...
	Urinary System (other)	114	2	5	4	2	4	4	13	13	18	23	20	5	1
	Generative Organs and Childbirth	44	...	...	...	...	...	4	17	16	4	3	...	...	...
	Other specified Diseases	179	35	31	8	5	4	7	8	11	17	22	21	9	1
D	Marasmus and Atrophy	242	193	19	1	1	...	...	...	...	1	6	8	12	1
D	Old Age	171	...	...	...	...	...	...	...	...	...	6	65	79	21
D	Other Ill-defined Causes	8	4	1	...	...	...	...	...	2	...	1	...	...	...
E	Violence	169	48	26	13	4	2	...	10	8	17	16	11	11	3
E	Homicide	...	...	...	...	...	...	...	...	...	...	...	...	...	...
E	Suicide	19	...	...	...	...	1	2	5	2	5	2	2	...	...

TABLE D.

City of Manchester, 1906.—Causes of Death in Infancy and Childhood.

Causes of Death	Under One Year			Total under One Year	One and under Five Years				T u Y
	Under 3 months	3–6 months	6–12 months		1–	2–	3–	4–	
All Causes	**1,447**	**658**	**1,006**	**3,111**	**1,018**	**351**	**215**	**142**	4
Measles	3	7	100	110	206	74	43	25	
Scarlatina	...	...	1	1	7	16	22	17	
Whooping Cough	16	16	46	78	65	25	14	5	
Diphtheria (Memb: Croup)	...	...	13	13	23	14	22	10	
Fever (various forms)	...	...	...	...	...	...	...	1	
Diarrhœal Diseases	161	248	324	733	179	30	4	3	
Syphilis	26	6	6	38	1	...	...	...	
Tabes Mesenterica and Tuberc. Peritonitis	6	15	16	37	25	4	3	2	
Hydrocephalus	3	11	39	53	34	28	20	12	
Scrofula (other)	3	5	11	19	29	12	7	6	
Premature Birth	403	2	1	406	...	...	...	...	
Teething	...	1	22	24	21	2	...	...	
Convulsions	80	30	34	144	13	6	1	2	
Brain Diseases (other)	10	8	36	54	29	19	10	7	
Lung Diseases	99	103	223	425	267	67	39	26	
Atrophy, Marasmus	332	101	50	483	28	6	...	...	
Found Dead in Bed (overlaid)	51	14	2	67	...	...	...	...	
Suffocation	12	3	4	19	1	1	...	...	
Violence (other forms)	1	1	5	7	12	18	18	14	
Ill-defined Causes	6	1	1	8	...	1	2	1	
Unclassified	235	86	72	393	78	28	10	11	

TABLE E, 1881 TO 1906.—MANCHESTER.—ESTIMATED POPULATIONS. ANNUAL RATES OF MARRIAGES, BIRTHS, AND DEATHS *(a)* from all causes, and *(b)* from specified causes; also the percentages to total deaths of Inquest Cases, and of Deaths in Public Institutions; also the quinquennial averages from 1871–1906, with the average for same period.

	Years	Estimated Populations (Mean)	Persons Married	Annual Rates per 1,000 Persons living: Births	Deaths (All Causes)	Smallpox	Measles	Scarlet Fever	Diphtheria	Whooping Cough	Typhus Fever	Enteric Fever	Simple Continued Fever	Diarrhœa and Dysentery	English Cholera	Violence	Percentages to Total Deaths: Inquest Cases	Deaths in Public Institutions	Years	
Quinquennial Averages	1871–1875	477,344	24·6	38·9	28·3	0·26	0·64	1·08	0·08	0·78	0·14	0·43	0·21	1·92	0·03	0·94	7·2	13·4	1871–1875	Quinquennial Averages
	1876–1880	509,802	18·6	38·7	26·2	0·24	0·53	1·07	0·13	0·84	0·08	0·29	0·11	1·22	0·04	0·89	7·5	14·3	1876–1880	
	1881–1885	542,746	17·9	35·1	23·6	0·04	0·71	0·48	0·10	0·68	0·05	0·20	0·03	0·96	0·03	0·72	7·0	15·9	1881–1885	
	1886–1890	575,630	16·6	33·4	24·6	0·02	0·83	0·50	0·32	0·54	0·02	0·30	0·01	1·06	0·02	0·78	6·9	17·7	1886–1890	
	1891–1895	517,801	16·9	33·2	23·6	0·03	0·62	0·26	0·27	0·64	0·00	0·24	0·01	1·14	0·05	0·77	7·1	19·2	1891–1895	
	1896–1900	539,599	18·2	32·5	22·7	...	0·89	0·20	0·13	0·53	0·00	0·18	0·01	1·65	0·04	0·73	7·1	20·2	1896–1900	
	1901–1905	554,355	17·4	30·9	20·14	0·01	0·55	0·19	0·22	0·41	0·00	0·13	0·00	1·15		0·72	7·1	24·4	1901–1905	
Avge. 35 yrs.	1871–1905	527,154	18·8	35·3	24·8	0·10	0·70	0·60	0·17	0·67	0·05	0·27	0·06	1·32	0·03	0·80	7·1	16·8	1871–1905	Avge. 35 yrs.
	1881	530,051	17·8	35·9	22·8	0·03	0·29	0·34	0·09	0·71	0·03	0·17	0·06	0·73	0·02	0·84	8·1	15·9	1881	
	1882	536,324	18·8	35·7	24·0	0·05	0·89	0·34	0·11	0·87	0·10	0·25	0·04	1·00	0·03	0·67	7·2	14·5	1882	

TABLE E—*Continued.*

Years	Estimated Populations (Mean)	Persons Married	Annual Rates per 1,000 Persons living: Births	Deaths (All Causes)	Smallpox	Measles	Scarlet Fever	Diphtheria	Whooping Cough	Typhus Fever	Enteric Fever	Simple Continued Fever	Diarrhœa and Dysentery	English Cholera	Violence	Percentages to Total Deaths: Inquest Cases	Deaths in Public Institutions	Years
1883	542,671	17·8	34·9	24·4	0·01	0·71	0·81	0·11	0·62	0·05	0·20	0·03	0·95	0·03	0·73	7·0	15·5	1883
1884*	549,093	18·0	34·4	23·4	0·01	0·57	0·74	0·08	0·49	0·03	0·19	0·03	1·46	0·05	0·65	6·2	17·3	1884*
1885	555,591	17·0	34·8	23·6	0·08	1·08	0·17	0·10	0·71	0·04	0·17	0·01	0·64	0·02	0·69	6·4	16·4	1885
1886	562,166	16·4	34·7	24·1	0·00	0·27	0·41	0·15	0·57	0·03	0·29	0·01	1·34	0·04	0·71	7·2	17·0	1886
1887	568,819	16·6	33·9	25·4	0·01	1·54	0·63	0·23	0·50	0·02	0·31	0·01	1·19	0·02	0·77	6·9	16·1	1887
1888	575,550	16·0	33·3	23·3	0·07	0·27	0·42	0·36	0·79	0·02	0·33	0·02	0·71	0·01	0·74	6·7	18·3	1888
1889	582,362	17·0	33·1	24·2	0·00	1·22	0·45	0·51	0·45	0·01	0·31	0·01	1·00	0·03	0·89	6·5	18·2	1889
1890*	589,253	17·0	31·8	26·2	...	0·83	0·60	0·36	0·37	0·01	0·27	0·02	1·04	0·02	0·79	7·0	19·1	1890*
1891†	‡ 508,673	17·2	33·8	26·0	...	0·43	0·22	0·25	1·02	0·01	0·37	0·01	0·81	0·04	0·79	6·8	18·4	1891†
1892†	‡ 513,196	17·2	33·4	23·2	0·00	0·72	0·27	0·25	0·72	0·00	0·24	0·01	0·79	0·02	0·77	7·4	18·2	1892†
1893†	‡ 517,760	16·0	33·4	24·3	0·09	0·57	0·27	0·35	0·46	0 00	0·25	0·01	1·75	0·10	0·76	6·9	18·7	1893†
1894†	‡ 522,365	16·8	31·8	19·8	0·04	0·42	0·22	0·29	0·55	...	0·17	0·01	0·70	0·02	0·75	7·5	21·3	1894†
1895†	‡ 527,010	17·4	33·4	24·5	0·00	0·96	0·33	0·21	0·47	...	0·18	0 01	1·66	0·06	0·80	6·9	19·2	1895†
1896†*	‡ 531,697	18·3	32·8	22·0	...	1·05	0·37	0·15	0·66	0·00	0·22	0·01	1·04	0·02	0·71	7·4	19·7	1896†*
1897†	‡ 536,426	17·8	32·9	22·4	...	1·17	0·23	0·08	0·56	0·00	0·18	0·00	1·74	0·06	0·68	6·6	20·0	1897†
1898†	‡ 541,296	18·3	32·3	21·2	...	0·50	0·12	0·09	0·31	...	0·22	0·01	1·96	0·06	0·69	7 0	19·5	1898†
1899†	‡ 546,010	18·4	32·2	23·9	...	1·28	0·08	0·16	0·42	0·00	0·13	0·01	2·02	0·03	0·78	7·0	19·7	1899†
1900†	‡ 542,566	18·0	32·4	23·8	...	0·47	0·19	0·19	0·68	...	0·14	0·01	1·49	0·03	0·78	7·4	21·9	1900†
1901†	‡ 546,408	17·6	28·7	21·6	...	0·53	0·23	0·24	0·41	0·02	0·14	0·00	1·86		0·78	7·9	23·2	1901†
1902†*	‡ 550,355	18·1	33·0	20·0	...	0·44	0·27	0·22	0·44	...	0·12	...	0·54		0·73	7·6	23·8	1902†*
1903†	‡ 554,331	17·8	31·7	19·5	0·04	0·62	0·17	0·25	0·38	...	0 17	0·00	0·91		0·72	7·0	25·3	1903†
1904†	‡ 558,335	16·5	31·1	20·9	0·02	0·76	0·15	0·18	0·50	...	0·12	0·00	1·36		0·73	5·9	24·6	1904†
1905§	‡ 631,933	17·0	29·0	17·8	...	0·37	0·12	0·20	0·31	...	0·09	0·01	1·15		0·59	6·7	24·1	1905§
1905‖	562,346	...	30·1	18·7	...	0·40	0·13	0·22	0·34	...	0·09	0 01	1·27		0·65	6·9	24·9	1905‖
1906§	637,520	18·0	28·9	19·02	...	0·75	0·17	0·19	0·30	...	0·13	0 00	1·54		0·62	7·3	25·4	1906§
1906‖	566,409	...	30·1	19·92	...	0·83	0·19	0·20	0·33	...	0·14	0 00	1·66		0·66	7·3	26·2	1906‖

* The facts for these years are for 53 instead of 52 weeks; corrections have, therefore, been made in calculating the rates.

† The populations and rates for the years subsequent to 1890, except the marriage rates, relate to the City of Manchester as enlarged by the Act of that year. The facts and rates for previous years are those for the three Unions of Manchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."

‡ These figures include a proportion of the inmates of certain Extra-municipal Institutions which receive patients from the City of Manchester, and are therefore in excess of the estimates of the Registrar-General.

§ Includes the newly amalgamated districts of Moss Side and Withington. ‖ Exclusive of Moss Side and Withington.

Note.—The population for 1900 is based on the Census figures of 1891 and 1901.

TABLE F, 1881 TO 1906.—MANCHESTER.

ANNUAL RATES OF MORTALITY FROM CERTAIN CAUSES OF DEATH.

YEAR	ANNUAL RATES PER 1,000 PERSONS LIVING										RATES PER 1,000 BIRTHS	
	Cancer	Tabes Mesenterica	Phthisis	Other Tuber: Diseases	Diseases of Nervous System	Diseases of Circulatory System	Diseases of Respiratory System	Diseases of Digestive System	Diseases of Urinary System	Diseases of Generative System	Puerperal Fever	Childbirth
1881–1885	0·50	0·35	2·42	0·57	3·28	1·37	5·41	1·23	0·48	0·08	3·03	1·99
1886–1890	0·64	0·36	2·24	0·59	3·09	1·73	5·76	1·23	0·61	0·08	3·22	2·13
1891–1895	0·62	0·22	2·09	0·75	1·74	2·53	5·56	1·07	0·52	0·07	2·75	3·42
1896–1900	0·73	0·19	2·04	0·63	1·32	2·54	5·03	1·04	0·49	0·09	1·55	1·51
1901–1905	0·80	0·16	1·94	0·55	1·17	2·56	4·29	0·95	0·49	0·08	1·21	1·76
25 years 1881–1905	0·66	0·26	2·15	0·62	2·12	2·15	5·21	1·10	0·52	0·08	2·35	2·16
1881	0·48	0·28	2·46	0·52	3·33	1·19	5·57	1·24	0·39	0·07	3·15	1·37
1882	0·44	0·40	2·41	0·61	3·35	1·34	5·33	1·19	0·45	0·08	3·92	1·62
1883	0·54	0·34	2·54	0·59	3·32	1·33	5·66	1·20	0·50	0·06	2·27	1·58
1884*	0·51	0·39	2·34	0·56	3·27	1·44	4·88	1·23	0·59	0·10	2·81	2·55
1885	0·51	0·36	2·34	0·56	3·12	1·53	5·59	1·28	0·49	0·08	3·05	2·84
1886	0·56	0·43	2·44	0·59	3·30	1·53	5·43	1·26	0·57	0·08	2·67	1·85
1887	0·62	0·39	2·19	0·53	3·17	1·66	5·72	1·23	0·53	0·08	3·58	1·35
1888	0·65	0·31	2·14	0·62	3·19	1·72	5·31	1·16	0·62	0·10	4·12	1·77
1889	0·70	0·36	2·12	0·59	2·94	1·79	5·06	1·28	0·64	0·08	3·06	1·87
1890*	0·65	0·33	2·33	0·62	2·87	1·93	7·28	1·22	0·66	0·08	2·68	3·89
1891†	0·63	0·25	2·20	0·78	2·30	2·69	6·77	1·03	0·55	0·07	3·08	4·01
1892†	0·61	0·21	2·05	0·75	1·70	2·59	5·44	1·14	0·53	0·05	3·79	4·54
1893†	0·59	0·26	2·05	0·76	1·70	2·48	5·53	1·20	0·53	0·07	3·70	3·94
1894†	0·66	0·18	1·97	0·67	1·48	2·31	4·35	0·96	0·49	0·04	1·93	2·77
1895†	0·63	0·22	2·16	0·77	1·51	2·60	5·73	1·04	0·49	0·11	1·25	1·82
*1896†	0·66	0·13	2·00	0·60	1·33	2·53	5·19	1·04	0·46	0·11	0·96	1·47
1897†	0·74	0·22	2·12	0·67	1·35	2·45	4·51	1·03	0·51	0·10	2·10	1·36
1898†	0·73	0·19	1·95	0·67	1·22	2·15	4·27	1·00	0·54	0·09	1·72	1·54
1899†	0·75	0·24	2·05	0·61	1·34	2·73	5·47	0·99	0·47	0·10	1·37	1·54
1900†	0·76	0·17	2·09	0·60	1·37	2·82	5·78	1·15	0·48	0·05	1·59	1·65
1901†	0·78	0·20	2·09	0·83	1·22	2·55	4·48	1·00	0·49	0·03	2·17	1·72
*1902†	0·79	0·16	2·08	0·55	1·13	2·61	4·71	0·93	0·58	0·11	0·94	1·65
1903†	0·76	0·18	1·85	0·58	1·25	2·46	3·95	0·99	0·46	0·08	0·80	1·59
1904†	0·81	0·15	1·98	0·54	0·76‡	2·71	4·38	1·02	0·50	0·09	1·04	2·13
‖ 1905†	0·86	0·12	1·56	0·48	1·06	2·47	3·70	0·81	0·41	0·09	1·09	1·80
1905§	0·86	0·13	1·68	0·50	1·10	2·49	3·94	0·83	0·42	0·10	1·12	1·71
‖ 1906†	0·88	0·14	1·71	0·49	1·06	2·68	3·52	0·91	0·47	0·07	1·63	1·63
1906§	0·89	0·15	1·81	0·52	1·09	2·69	3·75	0·95	0·46	0·08	1·76	1·70

* The facts for these years are for 53 instead of 52 weeks; corrections have therefore been made in calculating the rates.

† The rates of mortality for the years subsequent to 1890 refer to the City of Manchester as enlarged by the Act of that year. The rates for 1890 and for previous years are those for the three Unions of Manchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."

‡ 1·17, including Convulsions.

‖ Includes the newly amalgamated districts of Moss Side and Withington.

§ Exclusive of Moss Side and Withington.

TABLE G, 1900.—POPULATION, AREA, DENSITY. TOTAL BIRTHS AND DEATHS WITH BIRTH AND DEATH RATES.

[INSTITUTION POPULATIONS, BIRTHS AND DEATHS, DISTRIBUTED.]

STATISTICAL DIVISIONS		Estimated Population	Area in Acres	Persons to an Acre	BIRTHS		DEATHS		N F I
					Total	Rate per 1,000	Total	Rate per 1,000	
City of Manchester		**637,520**	**19,059**	**33**	**18,397**	**28·86**	**12,111**	**19·00**	
I.	Manchester Township	128,040	1,646	78	4,122	32·19	3,456	26·99	
II.	North Manchester	187,201	7,321	26	5,357	28·62	2,940	15·71	1
III.	South Manchester	322,279	10,092	32	8,918	27·67	5,715	17·73	
I.	Ancoats	43,575	400	109	1,531	35·13	1,175	26·97	
I.	Central	26,383	748	35	746	28·28	770	29·19	
I.	St. George's	58,082	498	117	1,845	31·77	1,511	26·02	
II.	Cheetham	41,004	919	45	1,172	28·58	478	11·66	1
II.	Crumpsall	9,301	733	13	193	20·75	129	13·87	
II.	Blackley	9,573	1,840	5	284	29·67	191	19·95	
II.	Harpurhey	20,989	193	109	499	23·77	296	14·10	
II.	Moston	17,935	1,297	14	453	25·26	209	11·65	1
II.	Newton Heath	38,521	1,350	29	1,084	28·14	738	19·16	
II.	Bradford	24,997	288	87	897	35·88	504	20·16	1
II.	Beswick	12,377	96	129	435	35·15	217	17·53	1
II.	Clayton	12,504	605	21	340	27·19	178	14·24	1
III.	Ardwick	44,261	509	87	1,355	30·61	789	17·83	1
III.	Openshaw	28,600	581	49	941	32·90	525	18·36	1
III.	West Gorton	31,529	318	99	900	28·55	533	16·91	1
III.	Rusholme and Kirk.	26,355	1,412	19	803	30·47	404	15·33	1
III.	Chorlton-upon-Medlock	56,361	646	87	1,313	23·30	1,165	20·67	
III.	Hulme	64,062	477	134	2,230	34·81	1,459	22·78	1
III.	Moss Side	28,105	421	67	604	20·49	398	14·16	
III.	Withington	43,006	5,728	8	772	17·95	442	10·28	

NOTE.—Calculated on the Census of 1891 and 1901.

TABLE H, 1906.

BIRTHS REGISTERED IN THE CITY OF MANCHESTER, IN ITS MAIN DIVISIONS AND IN DISTRICTS; DISTINGUISHING LEGITIMATE AND ILLEGITIMATE BIRTHS; ALSO THE PROPORTION OF MORTALITY AMONG INFANTS OF BOTH CLASSES UNDER ONE YEAR OF AGE.

STATISTICAL DIVISIONS		BIRTHS		Percentage of Illegitimate Births to Total Births	DEATHS UNDER 1 YEAR		PROPORTION OF DEATHS UNDER 1 YEAR PER 1,000 BIRTHS		
		Total	Illegitimate		Total	Of Illegitimate Children	Total	Legitimate	Illegitimate
City of Manchester		**18,397**	**650**	**3·5**	**3,111**	**235**	**169**	**162**	**362**
I. Manchester Township		4,122	168	4·1	879	71	213	204	423
II. North Manchester		5,357	137	2·6	794	51	148	142	372
III. South Manchester		8,918	345	3·9	1,438	113	161	155	328
I.	Ancoats	1,531	48	3·1	310	17	203	198	354
	Central	746	48	6·4	171	18	229	219	375
	St. George's	1,845	72	3·9	398	36	216	204	500
II.	Cheetham	1,172	35	3·0	110	9	94	89	257
	Crumpsall	193	10	5·2	29	3	150	142	300
	Blackley	284	3	1·1	30	2	106	100	667
	Harpurhey	499	10	2·0	82	6	164	155	600
	Moston	453	10	2·2	58	3	128	124	300
	Newton Heath	1,084	25	2·3	187	9	173	168	360
	Bradford	897	22	2·5	171	8	191	186	364
	Beswick	435	10	2·3	60	4	138	132	400
	Clayton	340	12	3·5	67	7	197	183	583
III.	Ardwick	1,355	53	3·9	232	14	171	167	264
	Openshaw	941	16	1·7	162	8	172	166	500
	Gorton (West)	900	31	3·4	173	17	192	180	548
	Rusholme and Kirk.	803	28	3·5	88	7	110	105	250
	Chorlton-on-Medlock	1,313	97	7·4	240	31	183	172	320
	Hulme	2,230	82	3·7	389	26	174	169	317
	Moss Side	604	14	2·3	68	2	113	112	143
	Withington	772	24	3·1	86	8	111	104	333

TABLE J, 1906.

Infantile Mortality in the City, and its Three Main Divisions.

Death-rates under One Year per 1,000 Births.

Causes of Death	City of Manchester	Manchester Township	North Manchester	South Manchester
All Causes	169·10	213·25	148·22	161·25
Measles	5·98	7·76	4·11	6·28
Whooping Cough	4·24	4·37	6·16	3·03
Other Com: Infectious Diseases†	0·76	0·97	0·93	0·56
Diarrhœal Diseases	39·84	58·47	30·80	36·67
Tubercular Diseases‡	5·92	7·04	3·36	6·95
Convulsions	7·83	7·04	8·21	7·96
Other Nervous Diseases§	2·94	2·67	2·99	3·03
Lung Diseases	23·10	30·08	20·91	21·19
Wasting Diseases ‖.....	48·32	57·74	44·80	46·09
Suffocation	1·03	1·70	1·12	0·67
Found dead in bed	3·64	6·79	2·99	2·58

† These are Smallpox, Scarlatina, Diphtheria, Membranous Croup, and various forms of "Fever" including the chief forms of Typhus and Typhoid.

‡ These are Phthisis, Tubercular Meningitis (Hydrocephalus), Tabes Mesenterica, and General Tuberculosis (Scrofula).

§ These are Meningitis, and other diseases of the Brain and Spinal Cord.

‖ These are Premature Birth, and such ill-defined causes as Atrophy, Marasmus, Debility, Inanition, &c.

TABLE K, 1906.—CITY OF MANCHESTER. ANNUAL RATES OF MORTALITY PER 1,000 PERSONS LIVING AT ALL AGES, IN THE CITY OF MANCHESTER AND IN ITS STATISTICAL DIVISIONS, FROM CERTAIN DISEASES AND GROUPS OF DISEASES.

CAUSES OF DEATH	City of Manchester	City—exclusive of Moss Side and Withington	Manchester Township	North Manchester	South Manchester	South—exclusive of Moss Side and Withington	City of Manchester Average of 10 years 1896-1905
All Causes	19·00	19·90	26·99	15·71	17·73	19·41	21·40
Smallpox	...	...	...	...	...	...	0·01
Measles	0·75	0·83	1·18	0·56	0·68	0·85	0·72
Scarlet Fever	0·17	0·19	0·27	0·20	0·11	0·14	0·19
Typhus Fever	...	...	...	...	...	...	0·00
Influenza	0·14	0·13	0·23	0·09	0·14	0·12	0·20
Whooping Cough	0·30	0·33	0·34	0·41	0·22	0·26	0·47
Diphtheria, and Memb: Croup	0·19	0·20	0·21	0·22	0·16	0·18	0·18
Ill-defined Fever	...	...	...	0·01	...	...	0·01
Enteric Fever	0·13	0·14	0·16	0·11	0·13	0·16	0·15
Diarrhœal Diseases	1·54	1·66	2·62	1·23	1·29	1·50	1·44
Puerperal Fever	0·05	0·05	0·05	0·06	0·04	0·05	0·04
Erysipelas	0·04	0·04	0·09	0·01	0·03	0·03	0·04
Pyæmia, Septicæmia	0·03	0·04	0·06	0·02	0·03	0·04	0·03
Phthisis (Tuberc: Pulmon:)	1·71	1·81	2·99	1·03	1·59	1·79	1·99
Tubercular Meningitis	0·30	0·32	0·40	0·20	0·32	0·38	0·27
Tuberc: Periton: Tabes Mes:	0·14	0·15	0·20	0·05	0·17	0·20	0·18
Tuberculous Dis: (other)	0·19	0·20	0·27	0·12	0·20	0·23	0·35
Alcoholism	0·11	0·11	0·19	0·09	0·08	0·09	0·13
Cancer	0·88	0·89	0·98	0·72	0·94	0·96	0·76
Rheumatic Fever	0·06	0·06	0·05	0·05	0·07	0·07	0·07
Premature Birth	0·64	0·67	0·66	0·61	0·64	0·73	0·65
Nervous Diseases	1·06	1·09	1·24	1·03	1·00	1·05	1·25
Heart and Blood Vessels Diseases	2·68	2·69	3·37	2·05	2·77	2·82	2·56
Bronchitis	1·59	1·71	2·59	1·48	1·25	1·44	2·08
Pneumonia	1·74	1·83	2·74	1·22	1·64	1·82	2·32
Respiratory Diseases (other)	0·20	0·20	0·21	0·17	0·21	0·22	0·27
Digestive Organs (Diseases of)	0·91	0·95	1·16	0·81	0·88	0·95	1·00
Urinary Organs (Diseases of)	0·47	0·46	0·51	0·41	0·49	0·47	0·49
Old Age	0·45	0·47	0·81	0·32	0·38	0·40	0·42

TABLE I, 1906.

MANCHESTER.—Certification of the Causes of Death in the Main Divisions and in Districts.

STATISTICAL DIVISIONS.	Total Deaths	Certified by		Not Certified	Proportion per cent. o Deaths		
					Certified by		
		Registered Medical Practitioners	Coroner		Regist'd Medical Practitioners	Coroner	Not Certifie
City of Manchester	**12,111**	**11,134**	**881**	**96**	**91·9**	**7·3**	**0·8**
I. Manchester Township ...	3,456	3,149	274	33	91·1	7·9	1·0
II. North Manchester	2,940	2,718	201	21	92·5	6·8	0·7
III. South Manchester	5,715	5,267	406	42	92·2	7·1	0·7
I. Ancoats	1,175	1,078	85	12	91·8	7·2	1·0
I. Central	770	674	83	13	87·5	10·8	1·7
I. St. George's	1,511	1,397	106	8	92·5	7·0	0·5
II. Cheetham	478	421	48	9	88·1	10·0	1·9
II. Crumpsall	129	120	8	1	93·0	6·2	0·8
II. Blackley	191	180	11	0	94·2	5·8	...
II. Harpurhey	296	277	18	1	93·6	6·1	0·3
II. Moston	209	200	7	2	95·6	3·4	1·0
II. Newton Heath	738	689	44	5	93·3	6·0	0·7
II. Bradford	504	462	40	2	91·7	7·9	0·4
II. Beswick	217	205	12	0	94·5	5·5	...
II. Clayton	178	164	13	1	92·1	7·3	0·6
III. Ardwick	789	736	45	8	93·3	5·7	1·0
III. Openshaw	525	483	36	6	92·0	6·9	1·1
III. Gorton (West)	533	486	46	1	91·2	8·6	0·2
III. Rusholme and Kirk. ...	404	377	25	2	93·3	6·2	0·5
III. Chorlton-upon-Medlock	1,165	1,057	93	15	90·7	8·0	1·3
III. Hulme	1,459	1,351	100	8	92·6	6·9	0·5
III. Moss Side	398	370	26	2	93·0	6·5	0·5
III. Withington	442	407	35	0	92·1	7·9	...

Causes of Death	Under 5 Years	5 to 14 Years	15 to 24 Years	25 to 44 Years	45 to 64 Years	65 Years and upwards
All Causes	66·60	3·67	3·37	8·94	28·34	105·51
Smallpox	...	...	...	...	...	...
Measles	6·31	0·13	...	...	...	...
Scarlatina	0·87	0·31	0·02	0·01	...	...
Diphtheria, Memb. Croup	1·13	0·23	0·02	0·02	0·01	...
Whooping Cough	2·57	0·05	...	...	...	...
Fever — Typhus	...	...	...	...	...	...
Fever — Enteric	0·01	0·08	0·15	0·21	0·12	0·05
Fever — Continued	...	...	...	...	0·02	...
Diarrhœal Diseases	13·07	0·02	0·01	0·02	0·12	0·77
Tubercular Diseases	4·01	0·82	1·36	2·74	3·78	2·01
Malignant Disease	0·04	0·02	0·05	0·51	3·38	7·47
Diseases of ... Nervous System	3·92	0·32	0·16	0·63	1·50	3·50
Diseases of ... Heart and Blood Vessels	0·25	0·25	0·37	1·20	7·50	35·84
Diseases of ... Respiratory System	11·35	0·46	0·52	1·42	5·98	24·51
Diseases of ... Digestive System	3·59	0·22	0·12	0·47	1·39	3·09
Diseases of ... Urinary System	0·17	0·11	0·08	0·35	1·21	4·22
Other Diseases	19·32	0·65	0·51	1·37	3·32	24·05

* For death-rates at all ages, see Table K.

TABLE N, 1906.—ANNUAL RATES OF MORTALITY IN STATISTICAL DIVISIONS ... SIX GROUPS OF AGES, * PER 1,000 LIVING AT THOSE AGE GROUPS, FROM CERTA... PREVALENT DISEASES, AND GROUPS OF DISEASES.

CAUSES OF DEATH	Under 5 Years			5 to 14 Years			15 to 24 Years		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes	95·48	54·48	62·04	4·49	3·45	3·46	4·89	2·57	3·2...
Smallpox	...	...	...	...	...	...	...	...	...
Measles	9·89	4·45	5·98	0·08	0·05	0·21	...	...	...
Scarlatina	1·53	0·82	0·61	0·42	0·42	0·20	0·04	0·03	0·0...
Diphtheria, Memb. Croup	1·53	1·17	0·93	0·12	0·32	0·23	...	...	0·0...
Whooping Cough	2·85	3·20	2·03	0·04	0·07	0·03	...	...	...
Fever — Typhus	...	...	...	...	...	...	...	...	...
Fever — Enteric	...	0·04	...	0·04	0·05	0·11	0·23	0·15	0·1...
Fever — Continued	...	...	...	...	...	...	...	...	...
Diarrhœal Diseases	21·63	9·51	11·70	0·04	...	0·02	...	0·03	...
Tubercular Diseases	5·71	2·21	4·47	1·23	0·49	0·86	2·23	0·89	1·3...
Malignant Disease	...	0·04	0·06	...	...	0·03	0·08	0·10	0·0...
Diseases of — Nervous System	3·98	3·94	3·89	0·38	0·35	0·28	0·15	0·03	0·2...
Diseases of — Heart & Blood Vess:	0·40	0·22	0·20	0·31	0·22	0·24	0·46	0·25	0·4...
Diseases of — Respiratory System.	17·32	10·08	9·58	0·81	0·37	0·38	0·85	0·43	0·4...
Diseases of — Digestive System	4·84	2·98	3·46	0·23	0·35	0·13	0·08	0·15	0·1...
Diseases of — Urinary System	0·46	0·09	0·09	0·15	0·17	0·05	0·04	0·08	0·1...
Other Diseases	25·35	15·83	19·02	0·65	0·59	0·68	0·73	0·38	0·4...

CAUSES OF DEATH	25 to 44 Years			45 to 64 Years			65 Years and upwards		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes	13·62	6·98	8·27	38·40	24·79	26·06	131·02	95·18	100·6...
Smallpox	...	...	...	...	...	...	...	...	...
Measles	...	...	...	...	...	...	...	...	...
Scarlatina	...	0·02	0·01	...	...	...	...	...	...
Diphtheria, Memb. Croup	0·03	...	0·03	...	0·04	...	...	...	...
Whooping Cough	...	...	...	...	...	...	...	...	...
Fever — Typhus	...	...	...	...	...	...	...	...	...
Fever — Enteric	0·26	0·16	0·21	0·16	0·13	0·10	...	...	0·09
Fever — Continued	...	...	...	...	0·04	0·02	...	...	...
Diarrhœal Diseases	0·05	0·02	...	0·16	0·13	0·10	1·00	1·04	0·56
Tubercular Diseases	4·48	1·83	2·59	7·09	2·10	3·29	3·26	0·83	2·07
Malignant Disease	0·61	0·43	0·51	4·27	3·03	3·19	4·77	6·86	8·75
Diseases of — Nervous System	1·09	0·43	0·57	1·72	1·72	1·30	2·76	4·36	3·39
Diseases of — Heart & Blood Vess:	1·75	1·13	1·03	9·12	6·43	7·39	41·42	29·72	36·52
Diseases of — Respiratory System.	2·49	0·93	1·29	9·12	5·08	5·16	34·39	20·57	22·59
Diseases of — Digestive System	0·69	0·32	0·46	1·35	1·22	1·49	3·77	3·33	2·73
Diseases of — Urinary System	0·58	0·29	0·31	1·04	1·39	1·20	2·76	3·12	5·27
Other Diseases	1·59	1·42	1·26	4·38	3·49	2·81	36·90	25·35	18·64

* For death-rates at all ages, see Table K.

TABLE O, 1906.—PARTICULARS AS TO MANCHESTER PATIENTS UNDER TREATMENT IN THE SEVERAL FEVER HOSPITALS DURING THE YEAR; ALSO OF PATIENTS FROM OUTSIDE DISTRICTS SENT TO MONSALL AND CLAYTON DURING THE SAME PERIOD.

Disease	Hospital	In Hospital commencement of year	Admitted	Discharged	Died	Remaining in Hospital close of year
Smallpox	Clayton Hospital	...	3	3	...	...
	Total	...	3	3	...	...
Scarlet Fever	Monsall	214	1,893	1,788	82	237
	Baguley Sanatorium	48	246	248	7	39
	Other Hospitals	1	...	1	...	...
	Total	263	2,139	2,037	89	276
Diphtheria	Monsall	21	233	183	47	24
	Baguley Sanatorium	10	53	56	3	4
	Other Hospitals	...	7	2	5	...
	Total	31	293	241	55	28
Enteric Fever	Monsall	26	238	189	41	34
	Baguley Sanatorium	...	...	...	...	...
	Other Hospitals	13	25	22	14	2
	Total	39	263	211	55	36
Typhus Fever	Monsall	...	...	...	...	...
	Baguley Sanatorium	...	...	...	...	...
	Other Hospitals	...	...	...	...	...
	Total	...	...	...	...	...
Other Acute Diseases	Monsall	14	247	201	38	22
	Baguley Sanatorium	...	2	2	...	...
	Total	14	249	203	38	22
All Diseases		347	2,944	2,692	237	362

PATIENTS SENT TO MONSALL OR CLAYTON, FROM DISTRICTS OUTSIDE THE CITY DURING THE YEAR 1906.

Disease	Northern Hospital	Swinton Schools	Royal Infirmary	Pendlebury Hospital	Deaf and Dumb Schools	Barnes' Convales. Hospital	Jewish Hospital	Ear Hospital	Outside Districts
Smallpox	...	...	...	...	...	...	...	...	...
Scarlatina	2	2	...	7	3	...	...	...	...
Diphtheria	...	...	1	1	...	...	...	...	...
Enteric Fever	...	...	1	...	...	1	...	...	5
Other Diseases	...	...	2	2	...	...	1	1	1

Total, 30.

TABLE P, 1906.—Work of Sanitary Department for the Year.

		TOWNSHIPS																					TOTALS
		Ancoats	Central	St. George's	Cheetham	Crumpsall	Blackley	Harpurhey	Moston	Newton	Bradford	Beswick	Clayton	Ardwick	Openshaw	Gorton (West)	Rusholme and Kirkmanshulme	Chorlton-upon-Medlock	Hulme	Moss Side (Incorporated Nov. 1904)	Withington	Didsbury	Chorlton-cum-Hardy	
Complaints to Sanitary Superintendent ...		347	556	356	458	18	7	22	13	89	23	18	2	129	44	54	112	441	241	151	...	...	...	3,081
Inspections of	Dwelling-houses	5916	3818	6549	4122	602	784	1016	1188	3269	1890	1525	1582	3099	2218	1872	1415	5081	9414	1169	...	...	...	56,529
	Newly-infected Dwelling-houses	387	111	466	355	85	110	194	186	375	130	78	103	182	205	264	158	241	304	115	...	...	...	4,049
	Cellars.....	1	...	48	191	...	...	...	...	...	...	2	...	...	...	...	2	...	...	...	...	...	...	244
	Schools	24	...	7	4	...	...	...	...	1	3	2	...	...	1	...	...	...	...	...	...	...	...	42
	Factories and Workshops	70	1	77	73	...	...	...	...	2	5	15	...	...	...	...	...	23	1	3	...	...	...	270
	Lodging-houses	576	1506	1498	1332	...	...	1	...	51	12	3	...	29	...	...	...	249	590	2	...	...	..	5,849
	Offensive Trades	27	118	109	4	...	...	1	2	15	27	15	20	...	...	2	4	1	4	6	...	...	...	355
	Dairies and Milkshops.....	590	701	813	257	40	50	92	60	126	174	210	70	341	167	120	231	405	910	116	...	...	...	5,473
	Bakehouses	143	144	110	288	30	20	107	90	82	85	5	32	116	83	99	119	316	231	141	...	...	...	2,241
	Canal Boats	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,937
	Slaughter-houses	1	9	6	4	...	5	1	...	6	2	...	...	...	12	...	20	2	1	...	...	...	...	69
	Tips for Refuse.....	..	...	2	4	21	...	...	127	10	...	...	...	...	...	...	...	...	...	...	...	...	....	164
	Miscellaneous Inspections	484	2076	957	127	45	10	21	209	190	101	135	292	810	139	98	553	1416	1426	752	...	...	...	9,841
	Factories and Workshops by Shop Hours, &c., Inspectors.....	735	5026	1045	2015	8	24	240	85	345	110	31	70	441	191	360	269	1389	997	369	...	...	...	13,750
	Shops by Shop Hours. &c., Inspectors	287	1182	370	538	1	4	195	53	209	63	...	24	76	115	94	88	288	249	230	...	...	...	4,666
Infected Rooms Disinfected		1186	457	1084	705	71	230	389	361	1117	406	259	11	786	637	952	219	501	964	12	...	...	...	10,347
Infected Dwellings Re-inspected		895	238	938	709	184	294	554	282	677	246	411	601	241	386	422	431	575	507	223	...	...	...	8,814
Drains Tested by Water		317	291	554	510	69	265	379	24	497	332	212	5	475	469	852	324	580	797	362	...	...	...	7,314
Smoke Abatement	Observations made	47	92	59	25	9	13	2	6	58	222	...	34	14	678	13	4	7	47	14	16	...	...	1,360
	Proceedings before Magistrates	6	19	5	3	...	9	1	1	27	9	1	19	8	7	3	1	...	7	2	...	...	...	128
Food Adulteration	Samples Collected for Analysis	184	265	194	64	18	17	47	24	72	65	40	41	62	68	100	81	269	603	209	97	73	91	*2,712
	Proceedings before Magistrates	16	42	1	5	...	1	2	...	1	4	...	...	...	2	15	4	...	15	3	...	...	4	115
Ashpits reported to Cleansing Department for emptying		3	3	...	2	72	68	75	56	23	36	...	159	2	3	20	27	7	14	34	...	...	...	604
Receptacles reported to Cleansing Department for emptying.....		50	27	21	40	8	...	20	...	...	17	...	...	21	4	10	...	56	80	1	...	...	...	355
Notices issued for Abatement of Nuisances.		1053	802	1583	1256	83	192	393	192	578	314	171	92	528	260	356	337	934	1334	226	2	...	...	10,686
Letters written for Abatement of Nuisances		82	81	164	145	6	4	8	4	23	22	6	4	20	13	11	3	75	146	1	...	...	...	818
Reports made to Medical Officer of Health		147	11	68	...	...	...	...	1	7	...	...	...	3	2	...	...	17	9	8	...	...	...	273
Legal proceedings taken		31	30	44	18	...	...	...	...	1	1	1	2	4	...	1	1	4	31	1	...	...	...	†174
Total Nuisances abated		950	661	1389	1103	97	165	312	173	465	248	201	136	662	302	165	342	845	1056	161	...	...	...	9,433
‡ Number of Cottages under Five Rooms....		7435	4964	9037	729	522	923	688	367	4409	2621	1285	402	4552	3510	3221	826	3805	8167	268	909	...	...	...

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